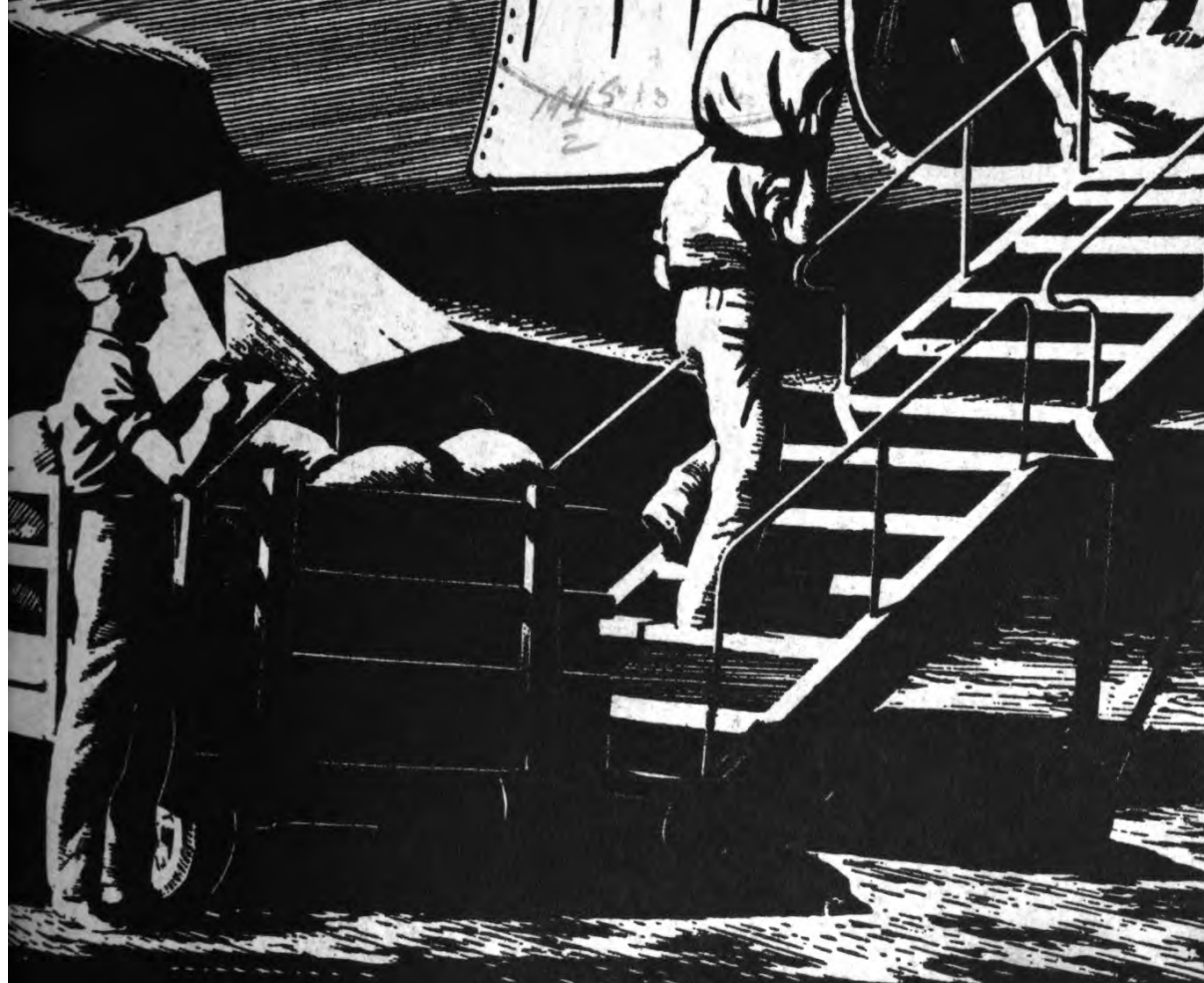


Aviation **SUPPLY**

1945 EDITION



NAVY TRAINING COURSES

Amoy

AVIATION SUPPLY

PREPARED BY
STANDARDS AND CURRICULUM DIVISION
TRAINING
BUREAU OF NAVAL PERSONNEL



NAVY TRAINING COURSES
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PREFACE

This book is written for the enlisted men of Naval Aviation. It is one of a series of books designed to give them the background information necessary to perform their aviation duties.

It is written primarily for Aviation Storekeepers. But since storekeeping has to do with supply and since supply is so essential to the success of Naval Aviation, all rates and specialists can profit by reading this book. It should be particularly valuable to Chief Petty Officers in the various aviation rates who are concerned with the hows and whys of material and its procurement.

This book is designed to give to the enlisted man a general picture of the functions of supply, as carried out by the Aviation Storekeeper. Briefly and generally, it describes the progressive movement of supplies, how allowances are determined for various aviation activities, methods to be followed in replenishing those supplies, and some of the forms which are used in Aviation Storekeeping. The most practical layout for a storeroom is discussed, and some of the peculiar problems which befall Aviation Storekeepers aboard ship or at an advanced base are covered.

As one of the NAVY TRAINING COURSES, this book represents the joint endeavor of the Naval Air Technical Training Command and the Training Courses Section of the Bureau of Naval Personnel.

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AVIATION SUPPLY



CHAPTER 1

WHY AVIATION SUPPLY?

IT KEEPS 'EM FLYING

“I get thar fust with the most men.” That was how the famous Confederate cavalry leader, General Nathan Bedford Forrest, said he won battles.

That was OK in General Forrest’s time. But in modern warfare, men alone aren’t enough. The man who also “gets thar fust” with his SUPPLIES is the man who wins today.

Modern warfare is a war of material. Material like AIRCRAFT. But aircraft soon become GROUNDRAFT if spare parts and maintenance equipment aren’t continuously available.

That’s why your job—aviation storekeeping—is such a VITAL and IMPORTANT one. The attack can fizzle if you’re not on the ball.

When the action is heavy, when airplanes are swooping down for a quick minor repair or reload, you become one of the most important links in the whole air battle

by knowing airplane materials, knowing airplane parts, and knowing how they are used.

You don't have to be right on the firing line to help win battles, either. If you're three or four thousand miles behind the front, and you speed the shipment of some vital part to a combat unit, you've contributed to the success of that unit's next operation.

In the very simplest form, the duties of an Aviation Storekeeper have been defined as "receiving, identifying, stowing and issuing material, keeping material and storehouse in good order." Somewhere else you can find among Navy bulletins that an Aviation Storekeeper must "know what to do in case of fire, smoke only where authorized, allow only authorized persons in the stores and keep doors locked when not in use, keep materials in good order at all times, and report to the proper authority any goods not fit for issue."

But still that isn't the whole story. You're part of SUPPLY. Without supply, the whole structure of aviation warfare, of attack, of defense, or patrol, crumbles. A pilot is stymied unless his airplane is functioning properly. A mechanic might as well be home shooting pool if he hasn't any parts with which to make a needed repair. And all the manufacturers and their workers might as well go back to gardening if SUPPLY doesn't get the materials and parts through to where they're needed.

A member of the Supply Unit of CASU 22 once wrote in the Paymaster General's Monthly Newsletter, "An aviator's primary concern is flying. He has not had the opportunity to study the complete picture you have, but he has been taught to think quickly, act promptly, and know that mistakes are fatal. He expects you to do your job according to those principles. The importance of providing 100 percent service cannot be over-estimated. The aviator balances his equipment and skill against life itself. The Supply Officer must consider the squadron's needs in exactly the same light."

As a doctrine to be followed and practiced in Aviation

Supply, the quotation defines the spirit of service imbued in successful aviation storekeeping.

One thing you'll learn early in your storekeeping career, if you don't already realize it, is that you're in the midst of the fastest moving phase of Naval warfare. Mechanical and technical developments are so rapid in



Figure 1.—Cannibalism has been practiced in combat areas.

aviation that everyone connected with it must be alert. Eternally alert! What was a fine, new model aircraft last week can be old stuff already being modified or changed by this week. Actually, new models or new engines have been developed and produced many times,

and before the parts peculiar to them could be catalogued and their descriptions and stock numbers distributed to the field storekeepers, technical changes would be made, making it necessary to scrap the catalog printing, if not the airplane itself.

And again—the demands for airplanes and airplane equipment may be so heavy that factories may not be able to keep up with them. Whereas normally a certain number of spare parts are produced as part of the original airplane order, the manufacturers can be besieged with demands for planes themselves to such an extent that they have to lag far behind on essential spare parts. Because of this, more than one airplane in combat areas has been the victim of CANNIBALISM.

This is as mechanically brutal as anything ever practiced by the humanly brutal tribes of Africa or the Far East. Airplane cannibalism, as you may have guessed, is the removal of parts from one good airplane to keep another one in the air.

Eventually—and probably sooner—parts production catches up with the complete airplane production and the endless searching for extra parts and materials ceases. In the meantime, it's well to remember that the sources of supply—the Bureau of Aeronautics, the Aviation Supply Office, the factories themselves—are confronted first with this problem. Rationing isn't something confined entirely to the folks back home when America fights a war.

KEEP 'EM FLOWING

BuAer, Aviation Supply Office, and others at the source of supply are constantly trying to keep the flow of materials going through the distribution points, the major supply points, and down to the most advanced aviation base, always keeping in mind the relative importance of the activity. There is no point in having a surplus of essential parts stored away at one activity

when planes at another are staying on the ground because of a lack of them. And the supply and distribution sources, through an elaborate and accurate inventory reporting method with which you'll become familiar, know what is most badly needed, and where. That's one reason why you may find a requisition from your own station, base or other activity not completely filled as you had hoped and requested. Someone else has priority over you—temporarily, at least.

STOREKEEPING IN THE ROUGH

Some day you may be called upon to set up a storehouse, starting from scratch, without all the more efficient means of construction at hand. You'll need to know good ventilation must be provided. You'll need to know that there is a **SYSTEM** of storing, a method of row by row, class by class, and that there's a way to anticipate the hazards of fire and avoid them.

Then, too, constantly you'll be called upon to package and crate parts and materials—even whole airplanes and engines. You'll have to package these materials the **RIGHT WAY**. Do it in what may seem the easy way—but still the wrong way—and more likely than not you've wasted your own time and that of others. And probably you've ruined the material being shipped.

Many times, highly sensitive instruments will have to be stored or packed or shipped. They're the little gadgets which very often mean the difference between the success or failure of a pilot on a mission. You have a chance to foul up the pilot's whole chance for life itself by packing his instruments carelessly or by not seeing that they are secured as they should be.

WHAT ARE PLANE DESIGNATIONS?

You'll be working with aircraft or aircraft parts so much that it will be helpful to know the various identifying symbols. Know the "why" for them.

Naval aircraft fall into four general classifications each of which is designated by a symbol. "V" is for heavier-than-air craft. "Z" is for lighter-than-air craft. "VL" is for gliders. "VH" is for helicopters. You will more than likely be dealing mostly with "V" type aircraft.

The mission for which each craft is designed is indicated by the addition of another letter. When two functions are performed, two letters are used.

For brevity, and for identification purposes, the Navy provides a final letter designating the manufacturer of the aircraft.

When you are referring to a particular model of any type aircraft, you drop the "V", but add to the letter describing the function a number identifying the model (unless it is the first), a letter indicating the manufacturer, and a dash followed by a number indicating the modification of the model, if there have been any modifications.

Airplanes themselves fall into several classifications. You'll find yourself from time to time handling materials for "landplanes" (top of figure 2) which alight only with the use of wheeled landing gear either on land or carrier decks. "Seaplanes" (right in figure 2), generally, are aircraft whose floats are separate from the fuselage. "Flying boats" (left) have their floats and fuselage designed in one unit, similar to the hull of a boat. "Amphibians" can alight on either land or water. Flying boats and seaplanes, of course, alight only on water.

AIRCRAFT GROUPS

You'll notice pretty quickly that even though sometimes the air seems to be full of airplanes, there is a pattern to it all—a definite organization which varies in makeup—in number of planes and types of planes—depending on the mission or kind of general activity.

Squadrons are made up of from six to 36 airplanes.

A "wing" normally includes one squadron of fighters, one of scouts, one dive bomber, and one torpedo squadron. Often, the makeup of the wings or squadrons is determined by the scene of operations. A small carrier, for instance, carries approximately 20 to 30 aircraft, the type depending upon the mission to be performed.

Cruisers carry from two to six airplanes of the sea-plane catapult type and their chief mission is scouting and observation for gunnery. Battleships carry from two to four airplanes of the observation scout type.

Other squadrons or wings usually consisting of four squadrons and a headquarters squadron of 12 planes

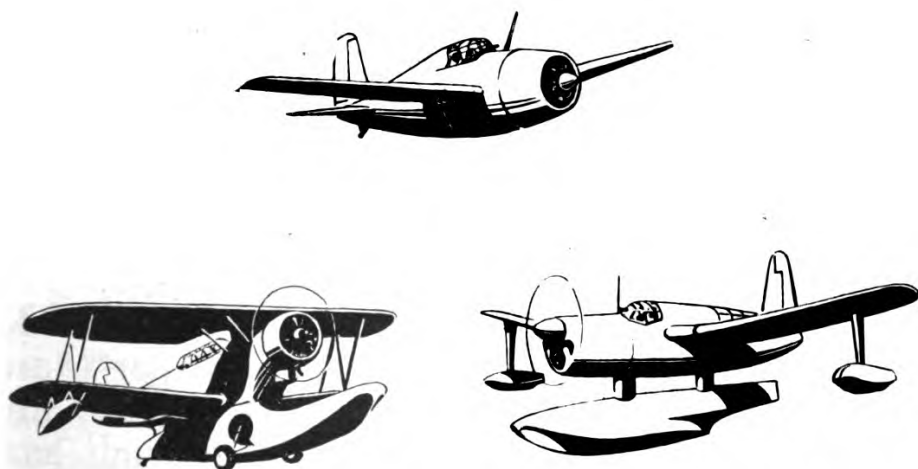


Figure 2.—Airplanes fall into several classifications.

each may be organized for patrol bombing. There are utility squadrons for miscellaneous tasks such as photography, ambulance duty, or transporting troops and supplies. Another type of operation is the Naval Air Transport Service whose airplanes fly on regular schedules throughout the United States and overseas, carrying both freight and passengers.

In the past few years several lighter-than-air stations have been established by the Navy. This type of aircraft is used for both convoy and anti-submarine patrol duty.

You'll find it helpful to get acquainted with the several "groups" of the individual airplane. The customary breakdown includes the Wing Group, Tail Group, Body

Group, Power Plant and Engine Group, Fixed Equipment Group, Useful Load Group, and Beaching Gear Group.

Manufacturers are required to furnish a catalog by groups. These catalogs are of great help in identifying parts.

WHAT ARE THE CLASS NUMBERS?

Just as long as you're handling airplanes and their parts in Naval Aviation Supply, you'll be bumping into CLASS NUMBERS. These are affixed to all parts as soon as they are standardized, and to most non-standard equipment. They are essential in identifying, accounting, requisitioning, cataloguing, and inventory operations.

There is no particular relationship between parts and their class numbers. The classes are arbitrary ones decided upon to indicate what the parts are or what they are used for. Classes 1 to 3, for instance, cover most aviation ordnance equipment. Class 1 includes aircraft guns, gun accessories, aircraft gun parts, and accessory parts. Class 2 consists of fire control and pyrotechnic equipment. Class 3 includes bomb handling and release devices, smoke screen, and tow target equipment.

Standard aeronautical equipment is found in two groups of stock classes—(1) 5 to 75, and (2) 80 to 94. Equipment and supplies in the first group are materials which are similar to materials used for general Navy purposes. As an example, many nuts and bolts in Class 43 are used only for aeronautical equipment, but they are similar to the nuts and bolts used on other types of Navy equipment. Rather than create a new class for the nuts and bolts used only in aeronautics, they have been lumped in with the others. The same is true of radio equipment in Class 16, electrical equipment in 17, and much other equipment such as tools, tubing, rubber and plastic materials, and dozens of other types.

Standard material and equipment peculiar to aviation and generally having no counterpart in other types of Navy materials are assigned to Classes 80 to 94. For examples, take aircraft instruments in Class 88, which are used only in aeronautics, and aircraft engine ac-

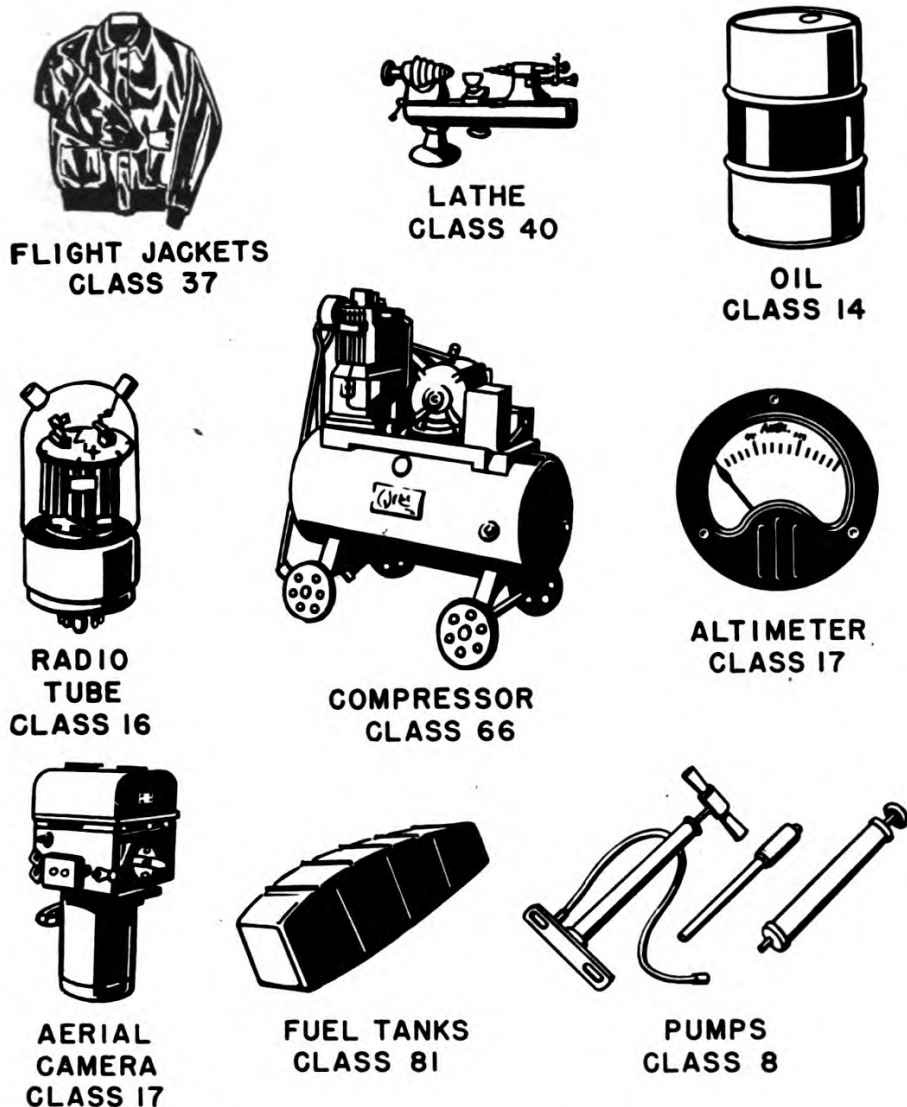


Figure 3.—Class numbers cover all materials.

cessory parts found in Class 86. Aircraft turrets are Class 93, and obviously, you'll never see them anywhere but in an aeronautical organization.

Non-standard materials likewise are found almost exclusively in Classes 80 to 94. They are items which

are peculiar to one type and model of airplane, engine, or accessory and which, generally, may not be used on any equipment except the model for which they were designed. Examples are ailerons for a Grumman fighter (Class 81), and parts for Wright engines (Class 85). Some of the non-standard equipment may be used on different models of equipment produced by the same manufacturer, but usually are not interchangeable with similar equipment produced by others.

Non-standard parts are carried on stock records and identified in storehouses by manufacturers' numbers, as the Navy does not assign its own stock number to this type of equipment.

The Aviation Supply Office publishes lists of these items and designates a class for each.

In case you're wondering what happened to Classes 76 through 79, those have been held in reserve for possible future expansion of the standard stock classification numbering.

MORE SYMBOLS

In addition to stock numbers, many of the standard aeronautical materials in both class groups (5 to 75, 80 to 93) have a further designation.

The Army Air Forces standardizes certain parts for use on its equipment, and many of these parts may also be used on Navy equipment. Such parts are preceded by an "AC" or "AAF." The Naval Aircraft Factory follows a similar practice for its naval planes, engines, and accessories. Those standard parts numbers are preceded by "NAF." A joint Army-Navy board has produced special drawings for standard parts or adopted from NAF or AC or AAF standards many items which can be used on various types and models of both Army and Navy planes, engines and accessories. These parts numbers are preceded by "AN."

Constantly, the Army and Navy air arms are attempting to standardize more and more their equipment so

that the same parts may be used interchangeably on airplanes, engines and accessories produced by different manufacturers.

WHAT'S AN ACORN?

And now for some brief introductions to unit abbreviations. If you're aboard a carrier or if you're at a combat base—and even if you remain at a station in the United States—you'll be running into these “alphabet outfits”—

ASO—the Aviation Supply Office—is an activity under the Bureau of Aeronautics and the Bureau of

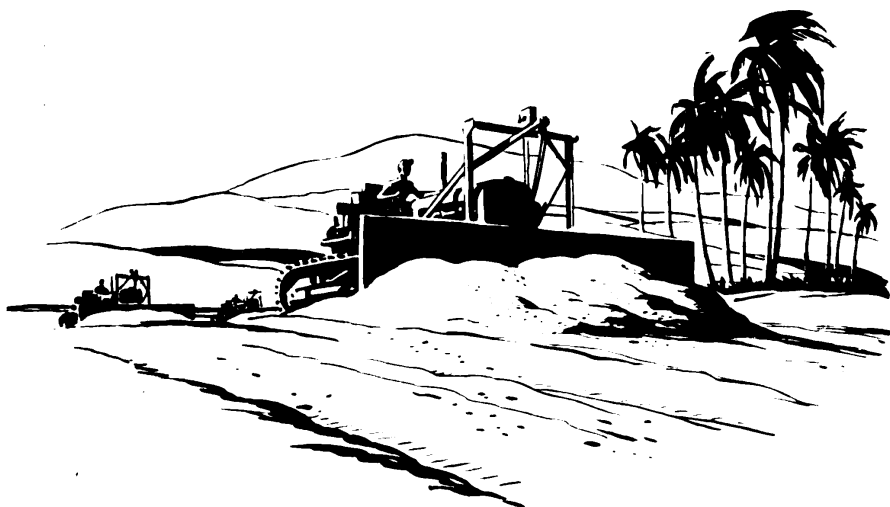


Figure 4.—ACORNs are fast workers.

Supplies and Accounts. It's the master control station for the procurement and distribution of aeronautical material. ASO works closely with BuAer in furnishing the wherewithal to keep airplanes flying.

ASA—Aviation Supply Annex (Continental)—distributing and major supply point for aeronautical materials (located at Oakland, California).

BuAer—the Bureau of Aeronautics—concerned primarily with technical phases of aviation. Initiates primary production, purchases new aircraft, and retains jurisdiction over distribution of certain aeronautical equipment.

ACORN—An airfield assembly unit for rapid construction and operation of landplane and seaplane advanced bases, or for quick repair and operation of a captured enemy airfield. Often works with amphibious forces.

CASU—Combat Aircraft Service Units. Shore-based units supporting flight operations of an air group or patrol planes by performing line maintenance duties. CASUs consist of personnel only. Material and equipment are furnished by ACORNS or other supporting activities.

CASD—Carrier Aircraft Service Division. Like a CASU but operates on a carrier, where it services aircraft. Upon boarding a carrier, the CASD may be broken up among different squadrons.

Sosu—Scout Observation Service Unit. These take care of the scout planes, either land-based or off battleships and cruisers, just as the CASUs service carrier-based planes.

CB—Construction Battalion manned with skilled and semi-skilled construction men for repair of captured bases, and erection of new bases. You've heard plenty about how the Seabees lay out airstrips like squeezing toothpaste from a tube.

CUB—An assembly of equipment and trained personnel to establish an advanced fuel and supply base furnishing support without repairs for a small task group of light forces.

FAIRWING—Fleet Air Wing. Several patrol or search squadrons operating as a unit.

FAWHedRon—The Fleet Air Wing Headquarters Squadron, including enlisted personnel of a patrol wing not part of combat flight crews together with all officers not members of the wing staff of the combat flight crews. Adequately manned and equipped with shop and hangars to support the flight operations of the aircraft attached to the operational command of the wing.

HEDRon—A headquarters squadron.

LION—A self-sustaining advanced base unit with components of a major, all-purpose base. Contains technical

shops and personnel to repair minor battle damage for a major portion of the fleet. Normally includes four ACORNS, engine and overhaul component, and five CBs (the last for construction and maintenance of roads, housing for personnel, technical buildings, utilities and communications, etc.).

Take a deep breath of relief. These definitions are just to give you a speaking acquaintance with the terms. You'll hear them and use them often enough as an Aviation Storekeeper. Memorizing or anything of that kind isn't at all necessary.



CHAPTER 2

ADMINISTRATION

FOLLOW THE FLOW OF MATERIAL

While a large part of aviation supplies move on authority of the Aviation Supply Office, you'll find that some bureaus affect supply as directly as does the ASO.

It's well to remember that ASO is a JOINT agency of the Bureau of Supplies and Accounts and the Bureau of Aeronautics. It was established to plan and carry through the vast program of supply to aviation activities. Although it has no control over some phases of aviation supply, such as the procurement of aviation ordnance and certain other aeronautical items, you will find that it does furnish most materials.

There are quite a few bureaus, and a half dozen agencies or other activities which have control over supplies. In storekeeping, you'll probably come in contact with all of them at one time or another.

First for the bureaus. They are the Bureau of Supplies and Accounts, the Bureau of Aeronautics, the Bureau of Ordnance and the Bureaus of Personnel, Ships, Yards & Docks, and Medicine & Surgery. Other controls are the Commander, Air Forces, Atlantic Fleet;

Commander, Air Force, Pacific Fleet; the Chief of Naval Air Training, and the Aviation Supply Office.

HOW THE BUREAUS FIT IN

BuAer receives its directives from the Deputy Chief of Naval Operations (Air). It procures equipment and materials and is responsible for the operation of all Naval aircraft. It has cognizance (and that's a word you'll be running into just as long as you're connected with Aviation Storekeeping) over material, construction, equipment, and maintenance of Naval Air Stations.

In aviation storekeeping, you probably won't have any direct connection with the advertising for bids, or the letting of manufacturing contracts, but you'll want to know that BuAer has that responsibility. After receiving directives from DCNO (Air), BuAer receives bids and lets contracts for the manufacture of aircraft and their square parts. In the manufacture of airplanes, a certain number of extra parts per plane are determined before manufacture begins. Usually, the number of parts isn't incorporated in the contract, but a value for them is. Often, an arbitrary percentage—30 percent, 20 percent, or whatever seems logical—of the contract price of the airplane is decided upon and that is made part of the contract.

Spare parts are part of the original manufacture and delivery. BuAer receives recommendations from ASO on the number and type of spare parts which should be included with each airplane.

BuAer, working with the skilled technicians of aviation factories, determines the type of aircraft to be manufactured. In the creation of a new design, there are countless requirements that are even overlooked by the technicians. Often, hundreds of deviations from original designs will be studied and approved by BuAer while the new model is being produced.

Deciding just where aircraft are to be sent after their manufacture is a function of DCNO (Air). It allocates

the aircraft and complete engines to squadrons, Fleet Air Commanders, and training activities.

BuAer is responsible for maintenance, repair, overhaul, and salvage or survey of aircraft and other materials falling under its cognizance. In it, too, rests the responsibility for procurement and distribution of engines in Class 84 and materials in Classes 89 and 93. It has full control over the procurement and distribution from the manufacturer, Aviation Supply Depot, and annexes of certain other equipment. It contracts only for materials and equipment in Classes 81, 82, 87, 88, 91, and 92. A study of the ASO Catalog (and other available material, will get you familiar with all these classes.

You've seen yourself how rapidly aviation changes. Changes mean new designs, new methods of manufac-



Figure 5.—DCNO (Air) decides who gets aircraft.

ture, new supply problems. Then, too, aviation as a tactical force is extremely maneuverable. You might be figuring on supplies for a squadron at one point today and find by tomorrow strategy had so changed that the whole group will be on its way to another point.

That problem isn't so marked for the Bureau of Ordnance. BuOrd initiates procurement of all items of aviation ordnance equipment coming under its cognizance and directs the distribution through the Supply organization. It allocates the equipment either into "reserve stocks" or "ready issue."

Its equipment falls generally into two types. That for individual aircraft models and squadrons of those

planes, and that for supporting activities such as major and minor air stations, auxiliary facilities, and advanced bases. BuOrd controls the movement of all materials in Classes 1 to 3.

The two Air Force Commanders, ComAirPac and ComAirLant, and the Chief of Naval Air Operational Training, control the issue of certain spare parts within the areas of their own commands. These parts include items on the "Espares List," which are critical parts. Items to equip the aircraft as well as operating spares are included. Complete units and complete spare parts sets and test equipment peculiar to airborne radio and radar equipment also are controlled within the command areas by the commanders of the forces. From time to time, other items are designated by BuAer, ASO, or the cognizant force or training command for their control.

Because of the fast-moving phases of air attack, control of many of the materials used by the fleets can most effectively be handled by the fleet commanders themselves. They have blanket authority to distribute a considerable part of the aeronautical material without obtaining prior authority from BuAer or BuOrd.

If you're attached to one of the fleet air activities, you'll learn soon enough that more than once material and equipment are needed now. Time to obtain authority from a central agency cannot be spared.

THE "GOM" OF SUPPLY

Supply, as you know, is the procuring, distributing and storing of materials and equipment. It's the "gettin' it, the keepin' it and the gettin' rid of it." At least that's how one Supply Officer expressed it in defining what he called the "Trinity of Supply."

A focal point in the Naval Aviation Supply set-up is the Aviation Supply Office—the ASO. It might be called the "GOM"—the Grand Old Man of Aviation Supply. It surely is from the standpoint of importance to the Aviation Supply organization.

Here it is that requirements for aeronautical materials are anticipated and provided to activities ashore and afloat. Here it is that needs for six, 12, and sometimes 18 months ahead are estimated and planned for. All this is done by utilizing all the information solicited from storekeepers and officers of the Supply Corps.

ASO is designed to fulfill a VARIETY of Aviation Supply functions. At the Aviation Supply Depot in Philadelphia, personnel of ASO face an endless round of problems. Problems in procurement, in distribution, in storage. The air commands of the fleets, for instance, and the Naval Air Operational Training Command all utilize combat planes. ASO must, with the aid of BuAer and the fleet and training commands, determine how much of the replenishing stock for combat planes is to go to fleet activities and how much is to go to the training program.

ASO is the primary agency responsible for the procurement and distribution from manufacturers, continental supply depots, and continental aviation supply annexes of all aeronautical material except that which has been delegated to the responsibility of BuAer, BuOrd, the fleet and training commands.

ASO alone is authorized to make emergency procurements of aeronautical material from the Army and from prime and sub-contractors. This does not, however, restrict Naval Aviation activities outside the continental United States from making emergency procurements from the Army.

This agency, whose offices and personnel stretch out over a vast acreage, has a number of groups or divisions within itself. There is the PLANNING Group which is among the few within the Navy who know the military actions planned by the Naval strategists. Only by knowing these secret plans can a sensible, efficient program of supply be planned and carried out.

It has an ENGINEERING group which studies technical problems in cooperation with the engineering division of BuAer. Its technical experts often are called upon to

suggest substitutions. That's something which will be expected of you, too, as you become familiar with aviation parts and their uses.

Also important in ASO is the MATERIALS group which is the heart of the agency. That's the outfit which actually gets—and keeps—the supplies MOVING.

Except for the initial outfitting of aircraft, ASO is responsible for the procurement and distribution of all standard aeronautical materials from Classes 5 to 75. It likewise directs the assembling of standard aeronautical materials and shop equipment for the commissioning of new aeronautical activities such as ships concerned with aircraft, new squadrons and advanced bases.

The bureaus, agencies, and activities concerned with and responsible for the supply of aeronautical materials and equipment are administrative in their functions insofar as supply goes. They are NOT warehouses.

Like manufacturers themselves, they have no facilities for storing the huge quantities of equipment and materials which must be kept available for replenishment and spot shipments. Under the force of heavy air fighting these last sometimes have to go outside the bounds of all the instructions, regulations, and safeguards put down in the book.

SUPPLY POINTS STOCK IT

To meet the broad demands for storage, a network of SUPPLY DEPOTS and MAJOR AND MINOR SUPPLY POINTS has been established. Although the primary depots are all located within the continental United States, major and minor supply points are scattered almost around the globe—wherever Naval Aviation may be, and wherever the Stars and Stripes may fly.

These major supply points are spotted for you on the map shown in figure 6.

The “distribution points” or supply depots are the Aviation Supply Annex, Oakland, California; the Naval

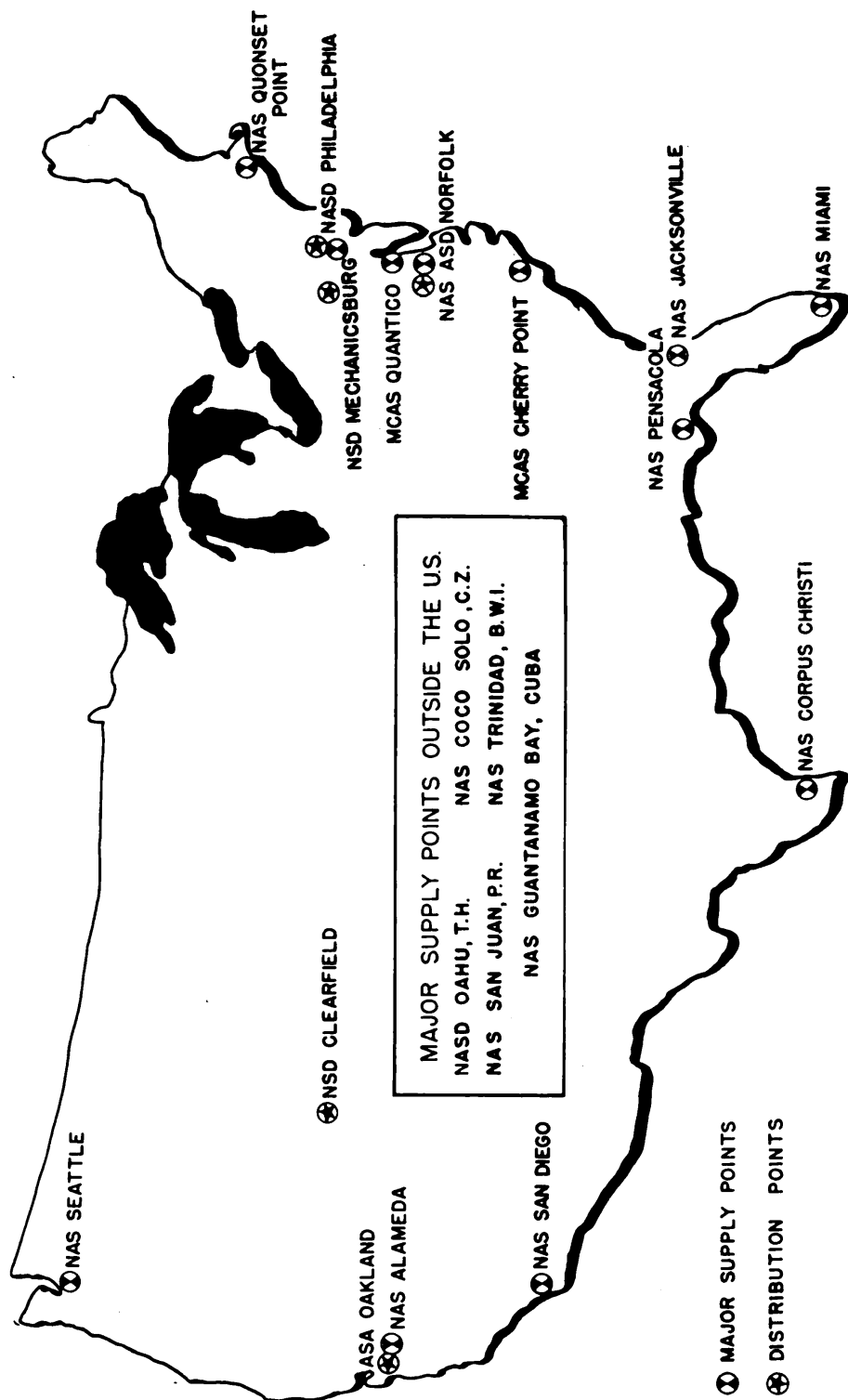


Figure 6.—Major supply points are scattered.

Supply Depot, Clearfield, Utah; Naval Aviation Supply Depot, Philadelphia, Pennsylvania; the Naval Supply Depot, Mechanicsburg, Pennsylvania; and the Naval Aviation Supply Depot, Norfolk, Virginia.

The major supply points stretch all the way from a Naval Aviation Supply Depot in the Philippines to the Naval Air Station at Quonset Point, R. I. Most of them are within the United States. Others are located at Coco Solo, Canal Zone; Guantanamo Bay, Cuba; Pearl Harbor, and elsewhere.

There is a varying number of DEPENDENT supply points attached to each of these major ones. In addition to the minor points at smaller air stations, there are others at auxiliary air facilities and air facilities. Air stations, for instance, at Daytona Beach and Sanford, Florida; Glynco, Georgia (for lighter-than-air), and eight other points are dependent upon the major Jacksonville station for their supplies. Auxiliary facilities, such as those at Cecil and Lee Fields likewise look to the Jacksonville station for working materials and equipment.

FROM FACTORY TO FLEET

A complete chart of the Naval Aeronautical Supply Organization is subject to continual changes and amendments. Your *BuSandA Memo*, Art. 2721, should indicate this organizational set-up, with latest changes.

You will note on this chart that the two-ocean fleet organizations are shown. However, a direct flow of materials from contractors to these activities is NOT shown. The fact is, the Pacific Air Forces look to Oakland for supplies and the Atlantic Forces to Norfolk. Tactical changes in a fast-moving war make it impossible to forward materials and equipment from the contractors to the exact locations where they will be used. Then, too, neither the manufacturer nor the operational activities have sufficient storage space to keep all the materials and equipment on hand. That's



BUREAU OF
AERONAUTICS



BUREAU OF SUPPLIES
AND ACCOUNTS

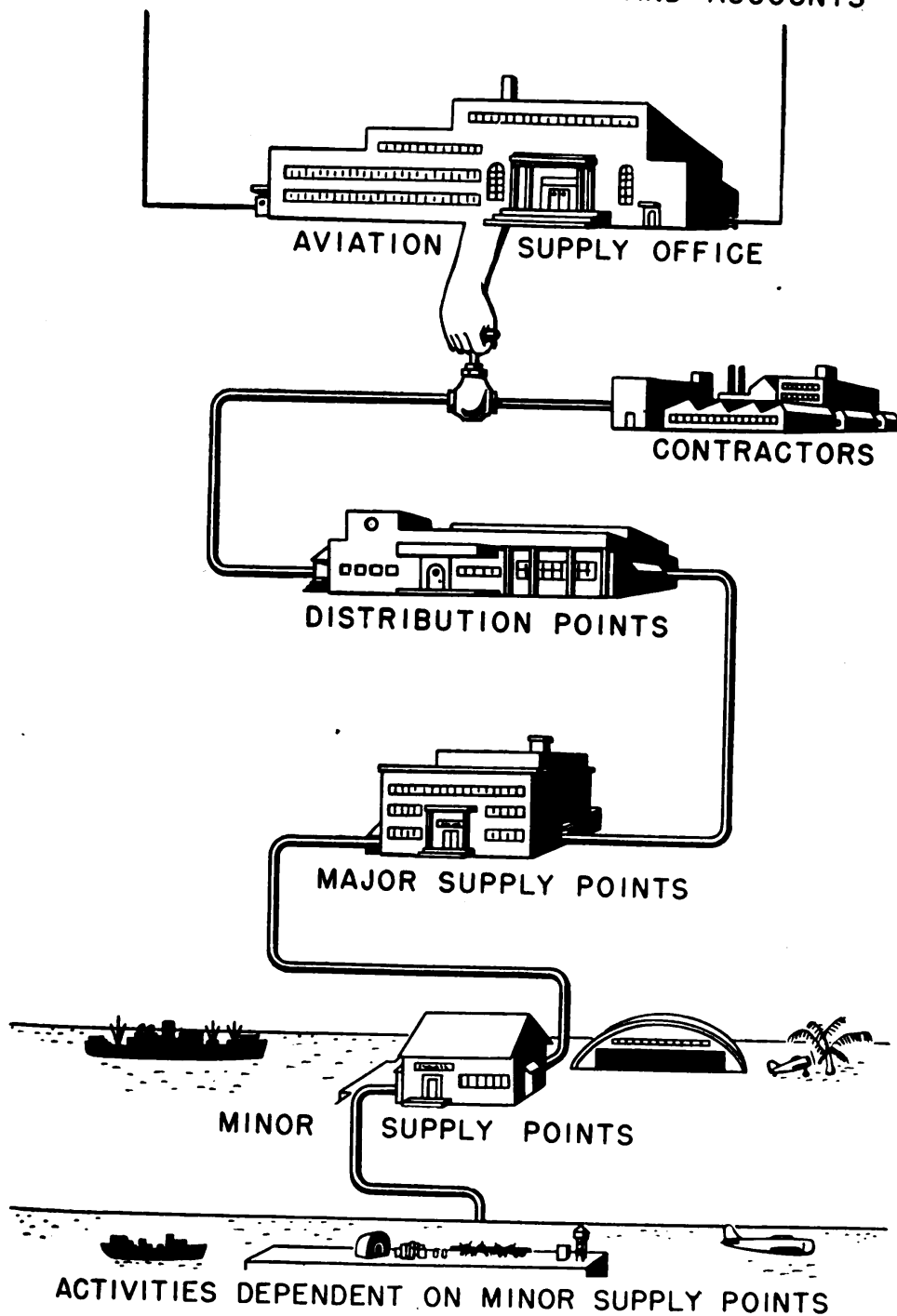


Figure 7.—Bureaus control material flow.

where the coastal distribution points and the major supply points come into the picture for actual distribution of supplies.

The two inland depots, at Mechanicsburg and Clearfield, are creations of World War II, and were located far inland partly for reasons of security. You will note, however, that one of them is in the eastern part of the United States, the other in the western part, providing quick movement of supplies to coastal activities. They are chiefly concerned with the storage of reserve stocks for further redistribution at regular replenishment periods. They are sometimes called "bulk" or "wholesale" storage depots for equipment and materials.

The Norfolk depot and Oakland annex stock material chiefly for combat airplanes. Materials from them move chiefly to forces afloat and to air stations supporting the fleet units. The NASD, Philadelphia, is the most important east coast supply point for Class 5 to 75 material. On the west coast, it's NASD, Oakland. They are concerned primarily with ready issue and heavier and lighter-than-air craft and issues to Fleet units, commissioning allowances, and other requirements.

The coastal distribution points, as you can see, are concerned more with the "retail" distribution of supplies. They are equipped with unpacking facilities and bins where large shipments can be broken down for ready issue in smaller lots to the requiring activities.

BuAer, ASO and BuOrd determine the flow of materials and equipment from the factory. They advise the manufacturers whether shipment is to be made to a distribution point or a major supply point. Procurement and stock control are not functions of the personnel at the distribution points and major supply points. Those are handled by the top initiating agencies or bureaus.

SUPPLY FORCES AFLOAT

You have seen how supplies flow to points ashore. Getting supplies to activities afloat, perhaps, is more

involved only because of the more varied types of supply receivers. There are aircraft carriers ranging from 45,000-ton class down to escort carriers. There are sea-plane tenders ranging from 12,000 tons down to 1,190 tons (converted types). There are battleships, large, heavy, and light cruisers, destroyers and DEs. And don't forget the advanced bases and CASUS, CASDS, SOSUS, and Fleet Air Base Wings.

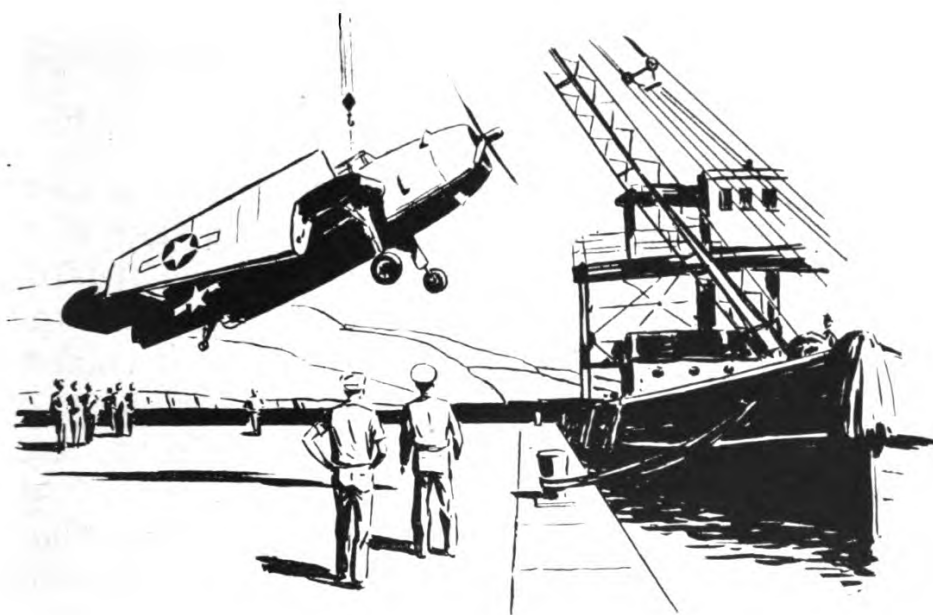
Aviation Stores issue to ships and barges, supplement the supply activities ashore in supporting fleet and advance base units.

All this maze-like organization has only ONE PURPOSE—to anticipate the need for supplies and have them where they are needed whenever possible. A great part of the success of the program depends on the success of Aviation Storekeepers.

You won't be mixed up with Aviation Storekeeping very long before you'll hear someone refer to Chapter 27, *BuSandA Manual*. It's good to get hold of, read, and digest. It contains instructions issued jointly by BuAer, BuOrd, and BuSandA which establish a definite pattern and working organization for the control of supply of aviation materials and equipment. Its instructions are based on comparatively recent experience.

It wasn't until October, 1941, that ASO was established. And it wasn't until the spring of 1942—after Pearl Harbor—that Aviation supply depots and annexes were first placed in use as distributing points for aeronautical materials. Reading this chapter of the manual will help clarify the various phases of the supply program and organization.

One further thought. The organization is described as it was at the height of war. There may be some changes in time of peace. Perhaps some of the supply points mentioned or shown on the supply organization chart will be inactivated. Perhaps others will be added.



CHAPTER 3

ALLOWANCE LISTS

HOW DID IT GET THERE?

If your first assignment is to a newly-commissioned activity such as a Naval Air Station, CASU, or advanced base, you'll probably wonder just how all the equipment and materials reached there. And you'll wonder, too, how the requirements could have been so well anticipated. But if you happen to reach one of these activities just before its commissioning, when the materials and equipment are coming in, you'll wonder just as much how the quantities were so well determined. Probably you'll wonder, too, what kind of guiding hand oversaw the planning that brought the supplies to you—and gave you plenty to do in getting them stored away.

You've heard of MULLIGAN STEW. In the old days the cook picked up practically everything he could lay his hands on and it went into the stew. Even today Mulligan stew is declared by some to be a tasty dish, but,

in any case, no one can deny that it is a handy outlet for the by-products of the kitchen.

RECIPE FOR A TBA

TABLES OF BASIC ALLOWANCES are kind of a mental Mulligan stew. Here is your recipe. You take all the past experiences you can get your hands on regarding consumption and loss of aviation materials and equipment. Add to it the technical knowledge of engineers in the Bureau of Aeronautics, Bureau of Ordnance, and the Aviation Supply Office. Be unsparing in the use of current information from Naval Aviation activities around the globe. Thow in a heavy portion of what is in the future for the activity for which the allowance list is being prepared. Then season it amply with the personal opinions of aircraft pilots, mechanics, storekeepers and others in the Supply Corps. Let it stew rapidly—but thoroughly—and the finished product is the Table of Basic Allowances, a testament, if not the Bible itself, for Aviation Supply.

These tables (TBAs) are the work sheets for Supply in furnishing any new activity with needed aviation materials and equipment. Sometimes it's a vast Naval Air Station. Sometimes it's a smaller, dependent station. It may be an aircraft carrier. Or it may be a seaplane tender. It can be a MAG (Marine Air Group). And sometimes it may be a streamlined squadron.

Every type of activity and every size of type will have different basic requirements. And all those requirements are worked out IN ADVANCE, forming the TBAs from which the quantities of supplies are shipped.

What does TBA look like? Figure 8 gives you an idea.

The tables are also set up to show estimates of the needs of the various activities AFTER they have been commissioned. Some will be needed at the end of every six months. Others show the expected needs at the end of every three months. In virtually every case, they are ESTIMATES. Storekeepers and Supply Corps officers

ITEM	STOCK NUMBER	NOMENCLATURE	ETL	UNIT OF ISSUE	CVE CVL	CV CVB		NOTES
1	2	3	4	5	6	7	8	9
		<u>Class 39</u>						
1	39-B	BOXES: Cruise (to be mfg. by CASD or other local means).	C	Ea	50	75		
		<u>Class 40</u>						
2	R40-A-94	*ATTACHMENT: Drill, universal 360°, 1/4" chuck cap., flexible shaft, 28-1/2" long, Army Spec. 50420.	B	Ea	11	2		
3	40-D-339-5	*DRILL: Electric, hand, 1/4" chuck, type A, 115V, 1700 RPM, light weight, Spec. 40-T-3 INT.	B	Ea	3	6		
4	40-D-341	*DRILL: Electric, hand, 1/4" chuck, type B, 115V, 500 RPM, light weight, (sim. or equal to Black and Decker No. V-346).	B	Ea	1	2		
5	40-D-345	*DRILL: Electric, hand, 1/2" chuck, type B, 115V, 1700 RPM, light weight, (sim. or equal to Black and Decker No. 361-40), Spec. 40-T-3 INT.	B	Ea	3	6		
6	R40-D-516	*DRILL: Pneumatic, portable, light weight, straight head, pistol grip, for 1/4" drill, complete with leader hose, Spec. D-27, type IV.	B	Ea	1	2		

Figure 8.—TBAs are guides, not limitations.

are urged to make helpful criticisms whenever they can as to necessary TBA revisions.

Except for two "sections" of aeronautical materials and equipment and all aviation ordnance, responsibility for developing the tables as well as getting the supplies to the various activities falls upon the Aviation Supply Office.

REMEMBER IT'S A GUIDE

The primary purpose of all allowance lists is to supply information regarding materials which must be assembled for commissioning aircraft organizations. After the organization has gone into commission the allowance lists become a valuable aid to the Supply Corps for stock upkeep purposes.

You should always make an attempt to keep quantities on hand as shown on the allowance list, unless actual experience indicates that the allowance list is incorrect. In this connection, storekeepers and Supply Corps officers dealing with aircraft can do a better job by thinking of the lists as a GUIDE rather than as a limitation.

If the lists are unreliable, the Supply Corps should take steps to obtain the needed material without regard to the list, obtaining prior approval from BuAer, ASO, or the Force Commander. If this is not possible or practical, obtain the material and make a report later that a departure was made from the allowance list. You **MUST** NOT hamper air operations because of fear or not following the allowance lists, but **MUST** use good judgment as the best guide. You'll want to remember, though, never to obtain more material than you can readily use. If you do, undoubtedly some other activity—just as hard pressed for materials as you—will be cut short of its needs.

WHY ALLOWANCE LISTS VARY

As mentioned earlier, quantities in the lists vary with each of the types of activity they cover. Fighter squad-

rons have different requirements than bomber outfits. Cruisers and battleships usually carry three airplanes or seaplanes, generally of the catapult type. Large carriers include approximately 100 airplanes while the auxiliary and smaller ones can be expected to carry 16 to 30.

Large tenders usually are equipped to service 24 seaplanes. Advanced bases are concerned only with the operational maintenance of the planes they will service. Air stations concern themselves with both operational maintenance and overhaul, so that their requirements will be more varied and in larger numbers than those for advanced bases.

Incidentally, don't worry about getting new TBAs as they are published. They are sent out automatically to the various activities concerned. Requests are unnecessary.

BuAer issues allowance lists, too. These provide for a particular range of material, broken down by the activities needing that material. In other words, a TBA for a VF squadron would list all the various and sundry types and then individual items of equipment required to set up such a squadron. The BuAer allowance lists are divided up by "sections" covering a particular kind of material—for example, shop equipment. The items may or may not be included in TBAs. Figure 9 will give you an idea of a BuAer allowance list's appearance.

You can always find out the story on an allowance list by reading its introductory pages. They will tell specifically what types of activity are covered by that particular list, how the information is arranged, and how you can change quantities allowed, if necessary.

Here are the BuAer allowance list sections and what they cover:

Section A—Standard Aeronautical Material.

Section B—For Aircraft Models.

Section D—Catapult Spares and Accessories.

Sections E and F—Arresting Gear and Barrier Spares.

Section G—Shop Equipment.

Section J—Spotting Models, Take-off Curves, etc.

Section K—Publications and Forms.

Section L—Aerological Material.

Section P—Photographic Equipment.

Section R—Airborne Radio and Radar Material.

Section S—Athletic Equipment.

Section T—Special Devices.

Section V—Aviation Training Films.

Section A is standard aeronautical material—nuts, bolts, tubing, hose, and other common maintenance items.

This particular section is aimed principally at the outfitting of newly-commissioned ships carrying or tending aircraft and Marine Air Groups. The section is made up of Federal Standard Stock and Standard Aeronautical Materials which are common to the operation, maintenance and repair of all aircraft assigned to such ships. Replenishment of these items is based on information which will be compiled on the stock record cards of each activity.

Section B includes accessory spares for the structural part of the airplane, and for the engine or engines of a particular model of airplane or airship. These lists generally fall into four groups. Single engine land type airplanes, single engine seaplane types, ship-based seaplanes (which usually are catapulted), and lighter-than-air ships. In each of these groups, too, you'll find lists covering standard parts for all planes and lists covering parts for particular models.

Four different lists may be included under Section G. One covers equipment for large carriers. Another for small and auxiliary carriers. The third is made up of tentative allowances for carrier escort vessels. The fourth lists equipment for tenders. These lists may also include shop equipment and some dock accessories needed to outfit various aviation shops on the vessels.

Other BuAer allowance list sections cover supplies with distinct uses such as "K" for publications and

forms, "P" for photographic equipment, and "T" for special devices.

Although the lists have a general pattern, there are variations for the different sections and types of activity. Usually, you'll find a column for the item number, another for the stock number, one for nomenclature in-

1	2	3	4	5	6	7	8	9
ITEM NO.	MFG. OR DWG. NO.	STANDARD STOCK NO.	NOMENCLATURE	UNIT OF ISSUE	NO. PLANES			USE AS DESIRED
		CLASS R45	HYDRAULIC GROUP - TBF-1 & -1C - "AC" SERIES (Cont'd)		6-17	18-29	30-40	
7175		C-5800-216	COUPLING ASSY - Steel, detachable hose end, bulkhead, male tube to hose connection, AC type, 3/8" outside tube diameter, ACA3B2483-6. (WH-54986) (AC series)	No.	See item	5975		
7180		C-5800-209	COUPLING ASSY - Aluminum alloy, medium pressure detachable hose end, short, male tube to hose connection, AC type, 1/2" outside tube diameter, AC43B2484-8D. (AC series)	No.	See item	5980		
7185		C-5800-316	COUPLING ASSY - Steel, detachable hose end, short, male tube hose connection, AC type, 3/8" outside tube diameter, AC43B2484-6. (WH-54906) (AC series)	No.	See item	5985		
7190		C-5800-414-25	COUPLING ASSY - Aluminum alloy, medium pressure detachable hose end, swivel to hose connection, AC type, 1/2" outside tube diameter, AC43B2485-8D. (AC series)	No.	See item	5990		
7195		C-5800-415-25	COUPLING ASSY - Steel, medium pressure, detachable hose end, swivel to hose connection, AC type, 1/4" outside tube diameter, AC43B2485-4. (WH-54804) (AC series)	No.	See item	5995		
7200		C-5800-416	COUPLING ASSY - Steel, detachable hose end, swivel to hose connection, AC type, 3/8" outside tube diameter, AC43B2485-6, (WH-54806) (AC series)	No.	See item	6000		
7205		V-18-256	VALVE - Aluminum alloy, plug two way, flared tube both ends, flanged triple type, outside tube diameter 1/4", drain valve at reservoir. (PA-720-HT-4D) (AC-AN series)	No.	See item	5405		

Page #79

TBF-TBM-1 & 1c

Figure 9.—BuAer allowance lists cover particular kinds of material.

cluding a complete description of the item, and another for notes or comments. There'll be one to show how expenditure of the item is classified and another indicating the unit of issue.

Still another, and sometimes several columns show the needs for a given number of airplanes. There may be one for "on custody receipts," which include office and hangar equipment used by a squadron while at a station. These items are returned to the custodian of equipment at the station when the squadron moves out.

Some of the lists break down the actual requirements. That is, there'll be a column showing the needs for a

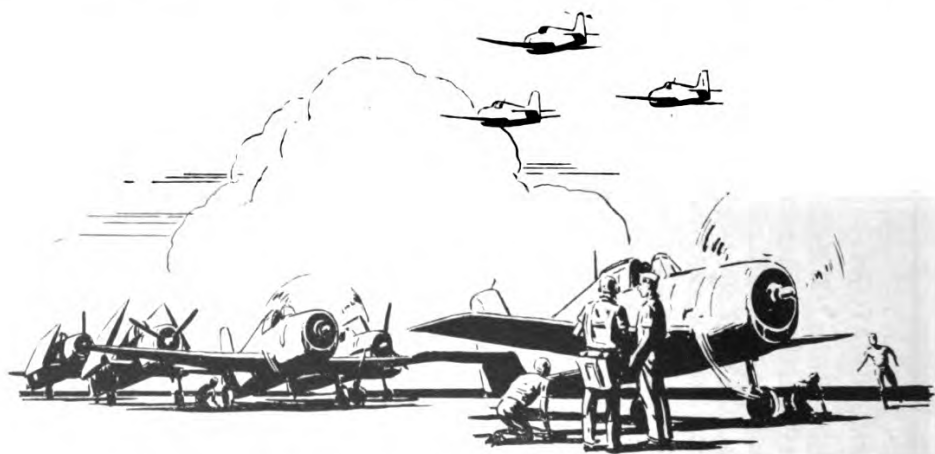


Figure 10.—Squadrons have individual requirements.

squadron of from six to nine airplanes, 10 to 12 airplanes, and so on up to 36 to 40 airplanes.

On other forms the needs may be shown for a fixed number of airplanes, say a squadron of 18. In the latter case, it's up to you to figure out the requirements for a unit which may be larger or smaller than the 18 airplanes. Obviously, you merely increase or decrease proportionately the allowance shown. If there are 27 in the squadron, your allowance will be 150 percent of that shown for the 18 airplanes, and if there are only six in the unit, you'll need $33\frac{1}{3}$ percent of what would be needed for the 18.

Then, too, you'll have to consider packaging. If a

gross of a particular kind of screw is needed for the 18-airplane squadron, you actually wouldn't need but four dozen for six airplanes. But looking at the "unit of issue" column, you'll note that screws are issued by the gross. It's much more sensible and efficient to issue them that way than to break open the package. So your six-airplane unit gets a gross of screws.

Because of the peculiar problems involved in the outfitting of ACORNS and other types of advance bases, allowance lists which pertain solely to these activities do not fall into the same categories as other aeronautical allowance lists.

There is a quarterly publication, "*Advance Base Initial Outfitting Lists*," for all components which are coordinated by the Bureau of Supplies and Accounts. The H- component lists are designated for specific aeronautical advance bases, and are prepared by BuAer (Advance Base Branch, Maintenance Division).

You'll find allowance lists for equipment which is non-standard prepared by the manufacturers themselves. Wright, for instance, gets out a list for all the parts that go into an engine such as the R-2600-12. These lists are prepared for insertion in the manufacturer's catalog. In them, the first column may show the manufacturer's part number, and the second nomenclature including AN (Army-Navy) and NAF (Naval Aircraft Factory) equivalents if there are any. Another will show the number of units to maintain a given number of engines for a specific time and still another will indicate the number of units per engine. Another will suggest quantities required for the overhaul of a specified number of engines.

HOW BUORD DOES IT

The Bureau of Ordnance initiates the procurement of all items of aviation ordnance material under its cognizance and directs the distribution through the supply organization. That much has been said before.

But BuOrd has lists, too—lists that usually provide for needs over a six-month period. BuOrd's lists vary a little from those of BuAer and ASO. You'll find the usual item number, nomenclature, and unit of issue columns. In addition there are four more designated "A," "B," "C" and "D." Under the first are shown the quantities of equipment needed to fully outfit an airplane or airship for normal combat.

Column B shows the number of spares and accessories required by a squadron over a six-month period under average conditions without any replenishment. The third of the last four columns is devoted to aircraft TRAINING equipment although quantities shown here are for information only and are not actual allowances.

Column D shows the allowances for squadron training equipment. These allowances will permit a unit to outfit one-half of its aircraft for training purposes.

Some Column A equipment is installed by the manufacturing contractor. Some is installed by the first activity to which the aircraft are assigned for fitting out or operation.

There's a definite limitation on ordnance equipment for obsolete or obsolescent models of aircraft. Allowances for them will be limited to "emergency pyrotechnic equipment" unless specific authorization is obtained from BuOrd.

In its instructions, BuOrd permits a supporting activity some flexibility regarding spare equipment. As an example, a CASU may get the word that it is to tend approximately 18 VF class airplanes, but there's no mention of the specific model fighters they are to be.

Since many items are common to all VF class airplanes (such as the BAM, .50 caliber M-2, Basic), the CASU will be allowed the number of spare guns indicated in Column B for 18 planes of this class. However, on such items which are not common to all VF class airplanes, the CASU will be allowed the number of spares indicated which are peculiar to each model in the VF class which are likely to base on the CASU.

YOU CAN HELP

This may be a relief to you. Every Table of Basic Allowances carries with it full instructions on its use—what the columns are, which ones are guides only and which must be followed to the letter. And remember, too, that although the best minds of ASO, BuAer, BuOrd and even British aeronautical engineering are thrown together to produce the tables, admittedly they aren't perfect products.

Each of the bureaus or agencies producing them wants suggestions from **YOU**, any time you notice where the allowances seem out of order. You're in the field and are in a good position to keep the technicians at home fully advised of conditions as they develop regarding Aviation Supply.

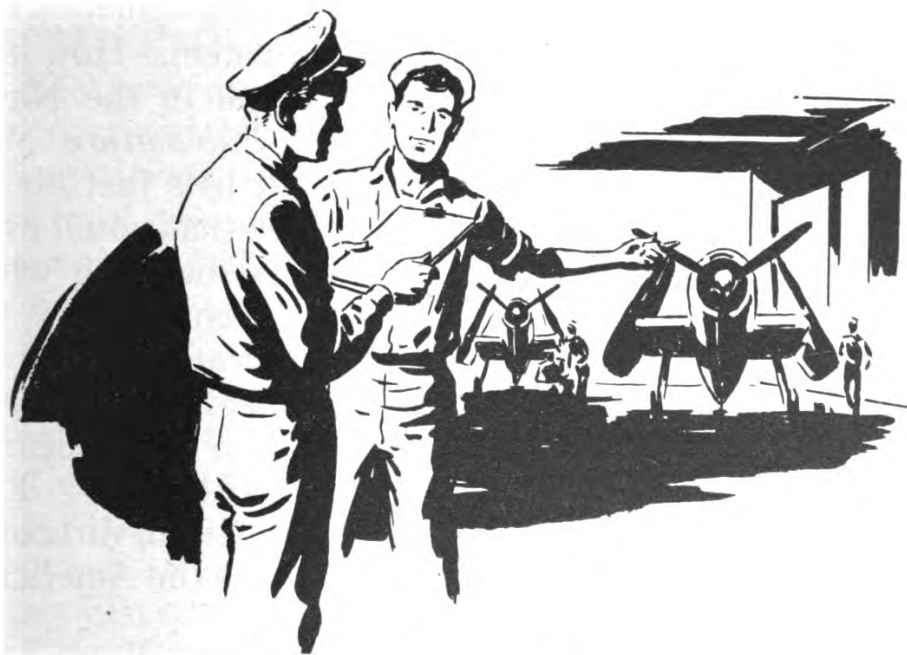


Figure 11.—Your suggestions are needed.

No end of time has been saved in the past by these Tables of Basic Allowances when an activity was about to be commissioned and when the period for replenishment of supplies came around. They've served well

as a guide to the men initiating the flow of supplies and to those making up replenishment requests. You'll find this mental Mulligan stew a tasty dish—something an Aviation Storekeeper will turn to very often.

TITLES AND ACCOUNTS

If you've been in the Navy very long, you've heard about TITLES for various types of material. Someone has probably told you more than once, "Now be careful of that, it's Title B," meaning it was non-expendable and had to be brought back, Title C designated material that was consumable—it was used up and written off the books after it was expended.

But Title B, Title C, and all the other letter designations of accounting classifications are OUT now. You can forget them. As of 1 July 1945, BuSandA inaugurated a new Classification of Expenditure Accounts which superseded the old Titles and Accounts System. How the new system works is described in detail in the Navy Accounting Handbook, *NavSandA Publication No. 45*. It's a fairly sizeable volume and it lists just about every category of MATERIAL or EXPENSE that you'll ever run into in a Naval activity. Then it shows to what account each of these expenses is to be charged.

The reason for this new and more accurate breakdown of accounts is a good one. The officers and management of a big company are responsible for their expenditures to the board of directors and the stockholders. The Navy is in the same position. Only its board of directors is called Congress, and its stockholders are the American people.

The old system worked all right before World War II, but with the complexities of war and the tremendous variety of expenditures required to build a FIGHTING air and sea Navy, the old titles just weren't flexible or specific enough to show exactly where the money was going.

So expenditures reported in the fiscal year of 1946

and thereafter will be codified through the use of five-digit numeric codes. These codes are made up so that expenditures can be classified into groups which can be related back to project estimates—the kind that are covered by appropriations approved by the Bureau of the Budget and by the Appropriation Committees of Congress.

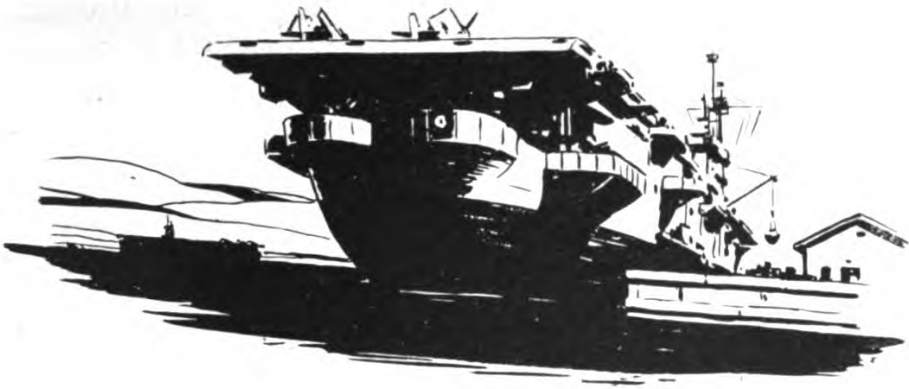
HOW THE CODE WORKS

Take one of the new expenditure account numbers for an example—62451. That five-digit number covers BEACH BARRAGE ROCKETS. The 60,000 series includes Manufacturing for Stores, and 62,000 indicates Appropriations Purchases Account material. (You'll learn more about APA material in the next chapter.) Now you're up to 62,400, and that "400" part of the number shows the material covered is under BuOrd cognizance. Rockets start with 62,450, and beach barrage rockets are 62451. Okay? Back where you started.

The new expenditure account number for aircraft, engines, and other equipment of that nature is 30,000. Then various breakdowns in more detail come along—overhaul of engines is an expenditure coded with the number 35,600, repairs to a propeller is 36,810, and so on.

Since the chart of expenditure accounts in the Navy Accounting Handbook runs to more than 100 pages, you can't expect to get it all here, but this gives you a general idea of how the new accounting system works.

It really boils down to this—expenditure accounts are designed to show your department, your ship, or your Navy just exactly where the money goes—what Congress and the American people are getting for their dollars.



CHAPTER 4

PROCUREMENT, REPLENISHMENT SCHEDULES

AVIATION SUPPLY IS BIG BUSINESS

Aviation storekeeping, as you've probably gathered by now, is strictly big business. You can't have distribution and supply points scattered all over the world without having "fixed policies of procedure," as business folks would say. Without streamlined and standardized methods of requisitioning material, all sorts of confusion would result and plenty of time would be lost.

It's said that you can't expect to receive letters unless you write them, but letters aren't what ASO wants when you're coming up with a request for some materials. ASO has to know just where to put its finger on the item or items **YOU NEED**, and doesn't want to have to go through some lengthy letter to find them. There isn't time for that.

No more than one **CLASS** of items is put on the same sheet of a replenishment request, and **SEPARATE SHEETS** are used for items produced by manufacturers. You see, when those requests get to Philadelphia or BuAer, they're distributed for handling to different sections within the Supply Department. One group of workers

handles certain classes of materials. Others handle requests for products of particular manufacturers.

That means **FASTER ACTION** on your request, for if you have a lengthy request, made up of a good many different items, the pages are separated when they reach the initial supply source, and several different sections in that way work at the same time getting your needed materials ready for shipment.

THE "GETTIN' OF IT"

Since responsibility for practically all **PROCUREMENT** rests with either BuAer, ASO or BuOrd, you may not have much to do with that part of Aviation Supply. Unless at one time or another your duties take you into one of these activities, there is practically no procurement done in the field.

Pilots of aircraft are authorized to obtain, incident to intermediate stops or forced landings, fuel, oil, material, and services from commercial sources as outlined in Art. 2726, *BuSandA Manual*.

Procurement is a vital part of the whole supply picture, and you'll want to know something of it. That's the "gettin' of it" in the Trinity of Supply which you read about earlier. If you'd like to have it in a little more dignified way, procurement is the "obtaining of aeronautical material by purchase directly from suppliers, and from secondary sources such as manufacturers and from the Army."

Aviation materials fall into two groups or categories. The first has been called "proprietary" by the supply people. That's just another way of saying that, generally, these materials are designed for one particular model of aircraft. Practically all of them fall in Classes 80 to 94. The second group is Standard Aviation Stock, materials which can be used for the maintenance and repair of various models and types. They're nearly all in Classes 5 to 75.

BuAer handles the initial procurement of "proprie-

AVIATION SUPPLY OFFICE

NAVAL AIRCRAFT FACTORY

STOCK LIST & REPLENISHMENT REQUEST

123143	198
REQUISITION DATE	PAGE NUMBER

4303	198
TAB GROUP	PAGE NUMBER

STOCK OR MANUFACTURER'S PART NUMBER (1)	ACTIVITY 101-REV 91-48	NOMENCLATURE (2)	UNIT (3)	REQ NO.	DATE		ESTIMATED UNIT PRICE DOLLARS (4) CENTS (5) SOURCE OF SUPPLY CODE	TABULATING NO. GROUP (6) SERIAL (7)	QUANTITY REQUIRED (8)
					(9)	(10)			
R43-W-90060 WASHER- LUCK STEEL LIGHT SERIES 1-2 IN BOLT SIZE AN 935-R16L		---	100 PER BOX	EA			P20534	43 8144000	5*
R43-W-90064 WASHER- LUCK STEEL LIGHT SERIES 9-16 IN BOLT SIZE AN 935-916L		---	100 PER BOX	EA			P20534	43 8146000	5*
R43-W-90068 WASHER- LUCK STEEL LIGHT SERIES 5-8 IN BOLT SIZE AN 935-1016L		---	100 PER BOX	EA			P20534	43 8148000	5*
R43-W-90072 WASHER- LUCK STEEL LIGHT SERIES 3-4 IN BOLT SIZE AN 935-1216L		---	100 PER BOX	EA			P20534	43 8150000	5*
R43-W-90310 WASHER- LUCK STEEL REGULAR SERIES SPEC W-45 2 BOLT SIZE AN 935-2		---	100 PER BOX	EA			P30534	43 8154000	
R43-W-90314 WASHER- LUCK STEEL REGULAR SERIES SPEC W-45 4 BOLT SIZE AN 935-4		---	100 PER BOX	EA			P30534	43 8156000	

Figure 12.—SL&RR forms show future needs.

tary" materials, such as complete airplanes, engines, accessories and spares that are ordered simultaneously. Sometimes it turns over to ASO responsibility for purchasing some of these items. SPARES THAT ARE NEEDED IN ADDITION TO THOSE ORDERED WITH THE ORIGINAL AIRPLANE ARE ALWAYS PURCHASED BY ASO. This agency, too, makes the initial purchase or procurement of all the Standard Aeronautical Materials found in Classes 5 to 75.

You've already seen how newly commissioned stations and advanced bases receive their initial stocks. They're shipped to the new activities as ASO or BuAer directs, without requisition from the activity.

These initial shipments are based on TBAs (remember? Tables of Basic Allowance). The initial stocks for ships, squadrons, wings and so on are determined in the same way and are shipped as directed by those two agencies. However, in the latter case, they come from "Assembly and Distribution Points for Commissioning Allowances." There are several of these special distribution points strategically scattered at such places as NAS, Quonset Point, R. I.; NAS, Norfolk, Va.; Marine Corps Air Station, Cherry Point, N. C.; NAS, San Diego, Cal., and other points.

REPLENISHING SUPPLIES

That's all very well for the INITIAL materials, but what about the procedure after they are exhausted? When more overhaul or operating spares are needed, or when standard stock wears out or is consumed in some way? Then you'll need to put in an order for "replenishments."

That's where forms for Stock Lists and Replenishment Requests come into the picture. And where you start needing to know about the schedule of replenishment. Start by looking at figure 12.

Standard parts, that is, Classes 5 to 75, are replenished at major supply points on an annual basis.

But replenishment doesn't take place all at once, at the beginning or end of the year, or in the middle of the year. The demands are so heavy from so many different points throughout the world that a schedule covering just about everything in the book has been worked out by ASO and BuAer. That keeps materials flowing to all activities every month in the year, keeps factories operating, and to a large extent avoids bottlenecks in supply. Likewise, it keeps you from flooding those offices with replenishment requests.

What you're reading now about replenishment DOESN'T cover aviation photographic equipment and supplies. They're handled separately with a schedule and procedure all their own, principally because they're highly sensitive and deteriorate more rapidly than other supplies.

SCHEDULES CHANGE

Since replenishment schedules undergo revision from time to time, no definite set-up can be included here. But as an example, suppose that replenishment of all items in Classes 8, 15, 24, and 51 are scheduled at ASO for 30 June. That means every year, you'll get your supplies of airplane tire and tube equipment, insulated wire, canvas and duck, acids and chemicals, shortly after 30 June. At least you'll start to get them, for ASO will insofar as possible scatter deliveries throughout the year.

Standard materials in other classes will likewise be scheduled for replenishment for each month in the year on an annual basis.

Materials in Classes 80 to 94, however, are scheduled for replenishment on a semi-annual basis. Since these are all non-standard parts, you'll find some of the same classes scheduled for each month in the year.

Classes 81 and 82, for instance, cover major and minor structural spare parts for airplanes. Since a large number of manufacturers produce these parts, they are not all scheduled for replenishment at the end of the same months.

ACCORDING TO PLAN

As another example, major and minor structural spare parts produced by Consolidated and Curtiss are scheduled for replenishment semi-annually on 28 February and 31 August. So are Class 83 airplane accessories and accessory parts.

Major and minor structural spare parts for airplanes made by Vought, Vega, and Lockheed are replenished as of 31 March and 30 September. These are also the replenishment dates for Class 82 AN, NAF, and AC standard material and miscellaneous commercial items.

Then on 30 April and 31 October, Grumman, Vultee, and General Motors structural spare parts, plus Class 87 propellers and parts, are scheduled for replenishment.

Other aircraft manufacturers' spare parts are replenished on other staggered dates, six months apart, so the replenishment load is evenly distributed.

As you can see, replenishment schedules have been carefully worked out in advance. Replenishment proceeds ACCORDING TO PLAN.

The use of Navy aeronautical equipment and materials is so widespread that their purchase and the control of their movements have to be CENTRALIZED for efficiency. And, too, some of them are so scarce that only by conducting their purchase and controlling their flow through a central agency can you be assured of your needed share of them.

The only way centralized purchasing can be done effectively is for the procuring agency to know what is needed at ALL the major supply points. If you're stationed at a major point, you'll find that all the replenishment requests from that point have to be at ASO or BuAer by the date shown on the Stock List and Replenishment Request form. That's so the needs can be consolidated into a SINGLE purchase for a particular item. Then, if there happens to be a shortage of that item, the one central agency can ration the material among the several supply points requiring it.

The main thing you need to remember is that unless the requests from the major supply point are in ASO or BuAer by the date indicated, your request won't be included in that particular schedule. It may even be held over until the next replenishing date for the materials and equipment you ask for. At best, it will be handled as an "ad interim" request.

You see, the principal advantage in the centralized procurement idea is that purchases can be consolidated. And you can't do any combining of purchases unless the needs are all known.

USE FORMS FOR REPLENISHMENT

ASO issues Stock Lists and Replenishment Request forms monthly by sections. That is, one month you'll receive (at a major supply point) forms for Classes 8, 15, 24, and 51, if those materials are scheduled for replenishment at the same time. Major supply points receive these forms 60 days before the replenishment date. If the date that the requests must be at ASO is 30 June, the forms will reach each major point not later than 30 April. Copies of the request forms are sent directly from ASO to dependent activities, for informational purposes, and for the dependent activities to make known their needs to the major supply points.

If you're at a dependent activity you **MUST** have the requests in to your major supply points at least 30 days before the replenishment date shown on the request forms.

Some pages of the form sections, as they are received, will have items listed that you won't need to replenish at all for the period covered. When forwarding the SL&RR forms, these pages will not be included, but on the last page of the forms sent in—or on a separate extra page—you will include an explanation, listing the pages which have been left out.

You'll notice that the earlier replenishment request forms carried "procurement symbols" and "limitation

symbols." The procurement symbol shows in Column 6 of the form and the limitation is indicated in Column 9.

WATCH THE SYMBOLS

The procurement symbols are letters preceding the "stock class" indicated in Column 7. There are several of these, and you'll get acquainted with all of them.

The letter "M," for instance, indicates that the item is to be MANUFACTURED LOCALLY by each activity requiring it, including dependent activities when possible. Major supply points will undertake the local manufacturing procurement when it cannot be done at the site of the dependent activity. In no case will ASO take action on requests for items preceded by "M."

The letter "N" indicates that the item is stocked only as a complete assembly, and not in detail pieces. "X" indicates that the item is standard stock and is to be requisitioned from Navy Yards or supply depots.

The limitation symbols are numbers appearing in Column 9, preceding the "quantity required."

Number "3" would indicate that the item is special equipment and material for manufacturing use. Requisitions must state specifically the use for which such material or equipment is required. These items will not be furnished to activities except the Naval Aircraft Factory or other manufacturing points designated and approved by BuAer.

Number "5" indicates that the item is obsolescent, obsolete, sub-standard, or not available. Requisitions of these items will be filled from existing stocks, but no new purchases will be made unless you explain fully what they are going to be used for and why you need the quantities requested.

Another symbol which shows in the catalog that you'll want to watch out for is the "T." This means you'll get the items indicated from the procurement division of the Treasury Department. You can save a lot of time by being on the lookout for that symbol. By sending

requisitions directly to the Treasury's Procurement Division they won't have to be re-routed from ASO.

These are just a few of the symbols used in the SL&RR forms. All of them are explained at the beginning of the sections, and you'll also find other helpful instructions there.

LOOK AHEAD

One thing you'll ALWAYS want to remember is that if you're preparing replenishment requests for a major supply point, you'll have to figure your needs on an 18-month basis. That is, try to estimate the quantity of



Figure 13.—Anticipating is a part of storekeeping.

each item you'll need for the next 18 months. If you're at a dependent activity, you'll be estimating for the next six months. Stock cards will provide a great deal of assistance. An application of plain, old horse-sense helps, too. TBAs also are a necessary guide.

Don't worry about delivery. ASO will schedule shipments so you'll always have on hand not less than a

six-month nor more than a 12-month normal stock of major supply parts.

The spare parts you'll be needing generally fall into two types. There are OPERATING SPARES and OVERHAUL SPARES. Operating spare parts are those that can be installed without extensive repair facilities—with limited facilities such as you might find if you're attached to a CASU or advanced base. Overhaul spares are MAJOR replacement parts that can't be installed except where there are well-equipped repair shops.

There are no allowance lists covering overhaul parts, and there isn't any set formula for deciding or estimating the number of parts you'll need. Storekeepers and others in Supply say there's a wide variation in what you may require. You'll have to take into consideration, for instance, items that can be reclaimed from the air station salvage departments.

Such items come from two sources—parts that can be removed from wrecked airplanes and used again, and damaged parts that can be repaired. Incidentally, you'll find these sources a good source for obsolete and obsolescent materials, too.

One stock clerk, in emphasizing the high variation in quantities of overhaul material needed, said that in his experience, replacement of glass surfaces ran around 30 percent. Surface control cables amounted to about 50 percent replacement, while exhaust stocks ranged all the way from 30 percent to 60 percent. He noticed practically no demand for replacement of airplane skin areas except for the compound curved surfaces.

As long as you stay in aviation storekeeping you'll hear the terms IN EXCESS or NOT IN EXCESS. Occasionally, you'll run into SURPLUS. There isn't a great deal of difference as they're used in Navy supply, except that "in excess" applies to the quantity of equipment or material that may be at a given supply point, station, or dependent activity, over and above what is actually needed. "Excess," then, applies LOCALLY.

"Surplus" applies to quantities that may be in stock

over and above the needs of the entire Navy. Whether or not quantities requested are "in excess" can be determined by looking at your TBAs. If what you are asking for is more than the TBA indicates as needed by your activity, you state on the replenishment request that it is "in excess." You not only state the fact, but you also explain WHY the excess is needed. You don't need any explanation if what you're requesting is less than or "not in excess" of quantities shown on the TBAs.

Jacksonville Naval Air Station and Miami Naval Air Station—both major supply points—might, after receiving replenishment requests and stock status reports from dependent activities, find that they have quantities of certain types of flight and protective clothing "in excess." But because of movements of squadrons not anticipated when the TBAs were made up, several other supply points, such as Corpus Christi, Alameda, and San Diego, may find that they need more clothing of this kind than was provided or suggested in the tables. The "in excess" REQUIREMENTS of these latter points may be greater than the "in excess" QUANTITIES ON HAND at Jacksonville and Miami so that actually there is NO SURPLUS within the Navy.

If you're at Corpus Christi, Alameda, or San Diego, you'll show on the SL&RR that your requirements are "in excess" and tell why. If you're at a major supply point where "in excess" quantities are located, you'll sit tight except for letting ASO know you have more on hand than you need. In all likelihood you'll receive instructions from ASO pronto. And likely as not you'll get the word to send along that extra material to Corpus Christi, Alameda, or San Diego—wherever it is needed.

This is another GOOD EXAMPLE of the benefits of a central purchasing and control office. If there wasn't one to direct the flow of materials and make purchases, you'd just keep those "in excess" materials in Florida. And if you were in Texas or California, you'd put through a purchase order for what you needed, putting an additional load on already strained production facilities.

MAKING UP THE DEFICITS

Human nature being what it is—even among Aviation Storekeepers—there are bound to be mistakes along the line in making up replenishment requests. No one can anticipate ALL the movements of squadrons and other factors which will change the supply picture.

So provision has been made for “ad interim requests.” These are nothing more than requests for materials and equipment needed in between the regular replenishment dates.

In thinking about ad interim requests, you can forget for now about Fleet-controlled items. These are provided for through special directives from time to time, depending on the location and operation of the Fleet, or they must be submitted to the cognizant Fleet Commander or his designated subordinate.

When items in Classes 5 to 76 are needed between the regular replenishing dates, you’ll forward your request directly to the point which is the normal source of supply. In the case of a dependent activity, that would be to the major supply point. In the case of a major supply point, to the distribution point.

If, however, you’re in need of materials falling in Classes 81 to 94, you forward your request directly to ASO. But wait a minute—the only ad interim requests in these last classes that ASO will fill are those for materials to repair aircraft or engines for which your activity has been designated as an overhaul point. ASO will also take care of your ad interim request for materials to repair crashed or grounded craft for which your activity has been designated as a place of repair.

RATIONING HERE, TOO

Major supply and distribution points may have to take rationing action on your needs. If filling your request will dangerously deplete current stocks, that’s the course they will follow, letting ASO know at once

of the unfilled part of your request. ASO will make it up immediately, if available, and if not, will start procurement for the needed items.

In making out these forms, you'll notice a space for "Delivery is required by" There you'll show whether the needed items should be shipped immediately or under "monthly consolidation," keeping in mind, of course, that shipping and all the handling is made easier and less costly if consolidated with the next monthly shipment.

Sometimes you'll run into emergencies that no one can anticipate or control. You'll just HAVE to have materials in a hurry. And you can be sure that your emergency requisitions will be handled just that way—as emergencies. Everybody up the line will be giving them immediate attention. If you're aboard an aircraft servicing vessel or attached to some other Fleet aviation activity, you'll send your emergency request to a major supply point or, if closer, to the dependent activity in your own area of operation. If neither of these is located within the area, shoot your emergency requisition to the nearest aviation supply activity for action.

If you're at a dependent activity or major supply point you'll handle your emergency in the same manner used for ad interim requests. Distribution points will make immediate shipment of the needed supplies if they have them, although they may reduce the quantities requested if they appear excessive. If the materials aren't on hand at distribution points, Supply Officers will advise ASO. And ASO will take steps at once to fill the unfilled parts of the requisitions, following the ad interim request procedure.

YOU MAY NEED A PRIORITY

Of course when you're urgently in need of materials or equipment, you will use PRIORITY REQUESTS. That's just to get them in ahead of others whose need is not as pressing, and to help ASO realize even more that you

are in a hurry. For that kind of a request you'll use telegrams, teletype, speed letters, mailgrams, or dispatches. But you'll foul up all the benefits from this kind of speedy transmittal if you put more than one class of material on an individual requisition. If you're asking for technical material don't put the material of more than one manufacturer on an individual request.

After you've put the requisition number and name of the station at the top of each page, tabulate the message by columns like this—(1) for the item number, (2) for the part or standard stock number, (3) for nomenclature, (4) for quantity. By following this columnar system your request can be handled smoothly and rapidly. If you don't follow it, your request just won't make sense. There'll have to be checkbacks and delay, and that's just what you don't want.

ORDERING PHOTO SUPPLIES

You'll follow a slightly different system when you're ordering aeronautical photographic equipment and supplies. There are now eight distribution points for this material. They are located strategically between ASD, SoPac, and NASD, Norfolk. These points may change from time to time as the theaters of war activity shift. The latest listing is included in Art. 2721, BuSandA Memo No. 504, dated September 1944.

Insofar as practicable, requisitions for photo supplies should be submitted semi-annually, reaching one of the designated distribution points PRIOR to 1 January and 1 July. Always submit these requisitions to the NEAREST aeronautical photographic supply point. Perhaps you'll want non-standard material that isn't in the list of aeronautic photographic supplies. Send your requests for it along in the same way (making sure you've given a complete description of the material wanted), and the distribution point will refer your request to BuAer for action.

Just like aviation itself, photographic equipment is

changing and being moved so rapidly there has to be a close check on it in order to quicken the flow of supplies. That's why, if you're at a photo supply distributing point, you'll be asked to send a quarterly inventory report to ASO, with copy going to BuAer.

NavAer Form 451 is recommended for this purpose. Mainland photographic supply points use this form in reporting monthly to ASO (except in the third month of



Figure 14.—His supplies come differently.

each quarter) receipts, quantities on hand, and obligations for each item of photographic material in which there has been a transaction during the month.

If you're stationed at a photo supply distribution point, you'll get replenishments automatically. They'll be based on your inventory reports.

If you're located at a photo supply distribution point outside the United States, you'll make regular and frequent requests for such supplies to the nearest distribution point on the mainland.

And here's another exception. If you're at an overseas photo supply point, you'll make monthly requests for replenishment of SENSITIZED STANDARD PHOTO MATERIALS to either ASA, Oakland, or NASD, Norfolk. Overseas, you're expected to maintain a six-month supply of photographic film and papers.

You may never have to order any aerological material, but if you do, the set-up for its distribution is outlined in Art. 2721, BuSandA Memo No. 509 dated February, 1945. There are 12 pools of aerological material between ASD, Guam, and NSD at Oran, Algeria.

L-T-A PROCUREMENT

Lighter-than-air craft now play an important part in Naval Aviation. But here you'll find a variation from the usual order for requisitioning some supplies.

If you're attached to a lighter-than-air activity, you'll send your requisitions for major structural spare parts (Class 91) and for minor structural spare parts (Class 92) and for other materials peculiar to airships directly to ASO. You'll make up requisitions for these materials so the requests can be forwarded semi-annually, on 1 January and 1 July. For items other than those in Classes 91 and 92, you'll follow the same procedure as that for regular Naval aeronautical equipment and materials excepting of course, the Fleet-controlled items.

LTA spare parts are stored at convenient points in the United States. Spare non-rigid envelopes, free balloons, and special fittings and attachments are at the Naval Air Station, Lakehurst, N. J.; Moffett Field, Calif.; and Richmond, Fla. You'll find all other stocks in Classes 91 and 92 at NASD, Philadelphia (for the eastern activities), and at ASA, Oakland (for western activities).

You'll discover that your aviation activity is using any number of parts and other items that don't appear on any of the SL&RRs. To get these items if you're at a major supply point you'll have to use a regular requisitioning procedure.

tion form (Bureau of Supplies and Accounts Form No. 76 or 76a.) or a shipment request (Bureau of Supplies and Accounts Form No. 220).

In general, these forms are used for materials in Classes 6, 10, and 17, for flight clothing in Class 37, and for technical aeronautical materials in Classes 81, 82, 83, 85 (except Pratt and Whitney and Wright engine spares), 86 to 89, and 91 to 94. They are also used for interim requests, and for materials in Classes 5 to 75 which ordinarily are in NSA (Naval Stock Account) and are obtained directly from Naval Supply Depots or Navy Yards.

HOW DO APA AND NSA DIFFER?

In connection with requisitions, you'll find that all the material you order is charged against one of two accounts. These are the Appropriations Purchases Account (APA) or the Naval Stock Account (NSA). You'll hear plenty about APA and NSA. So unless you already know, you might as well find out what they are right now.

Years ago a definite sum of money was voted by Congress to finance the procurement of standard stock material (non-technical) for general use of the Naval organization. This sum of money was called the Naval Stock Fund.

The Naval Stock Fund (NSF) is a revolving fund. The sum of money originally allocated to the fund by Congress is maintained at all times as CASH in the fund or the equivalent value is invested in material held in the Naval Stock Account (NSA).

This Naval Stock Account (NSA) is a Stores holding account in which material procured by money from the Naval Stock Fund (NSF) is held pending issue and charge to an appropriation.

When material is issued from the Naval Stock Account (NSA) the value is charged to the appropriation responsible for the support of the activity receiving the

material, and credit (reimbursement) is given to the NAVAL STOCK FUND. By this revolving method, the

APPROPRIATIONS PURCHASES ACCOUNT

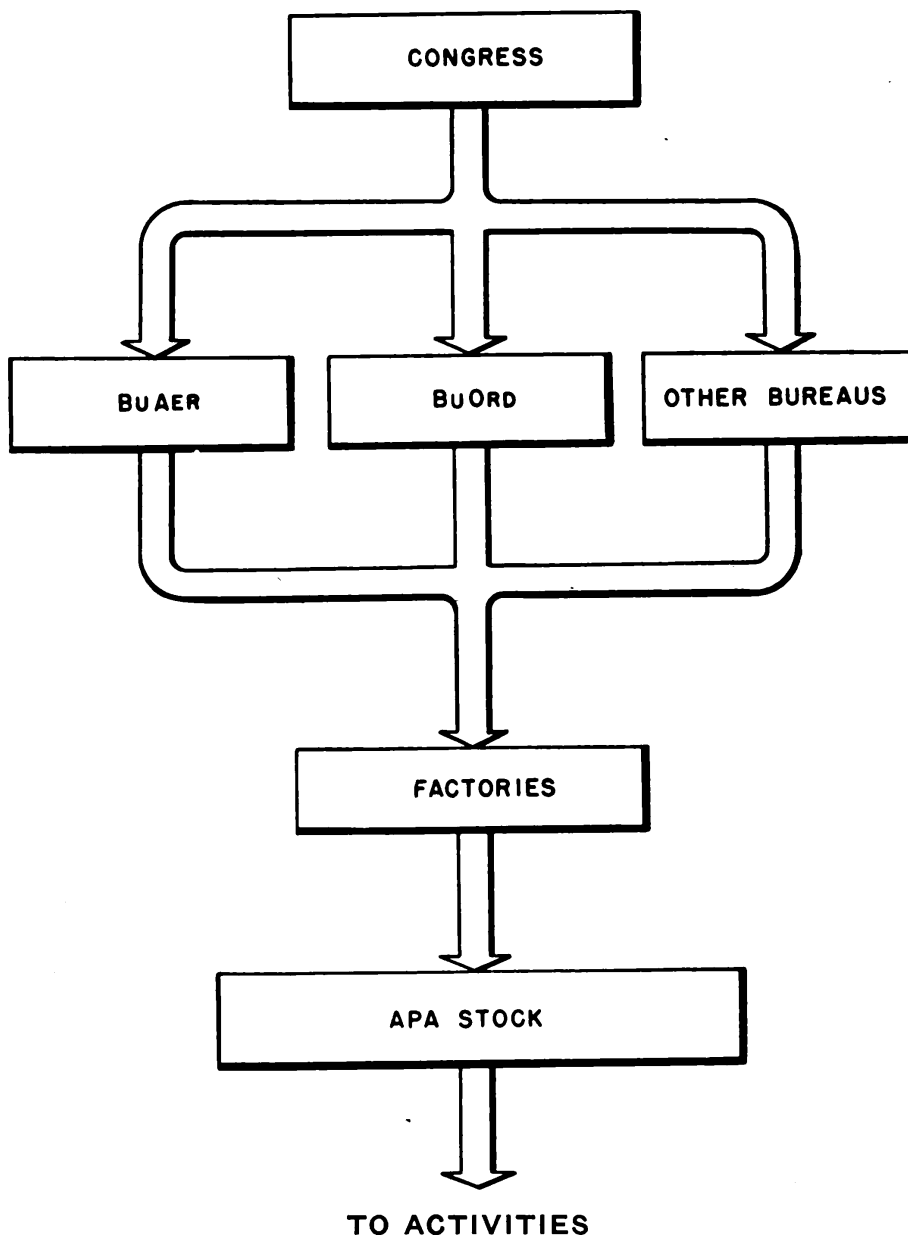


Figure 15.—APA money and materials flow like this.

money originally granted by Congress to establish the fund is continually being used to procure standard material for the Navy and is repaid from annual appropria-

NAVAL STOCK FUND

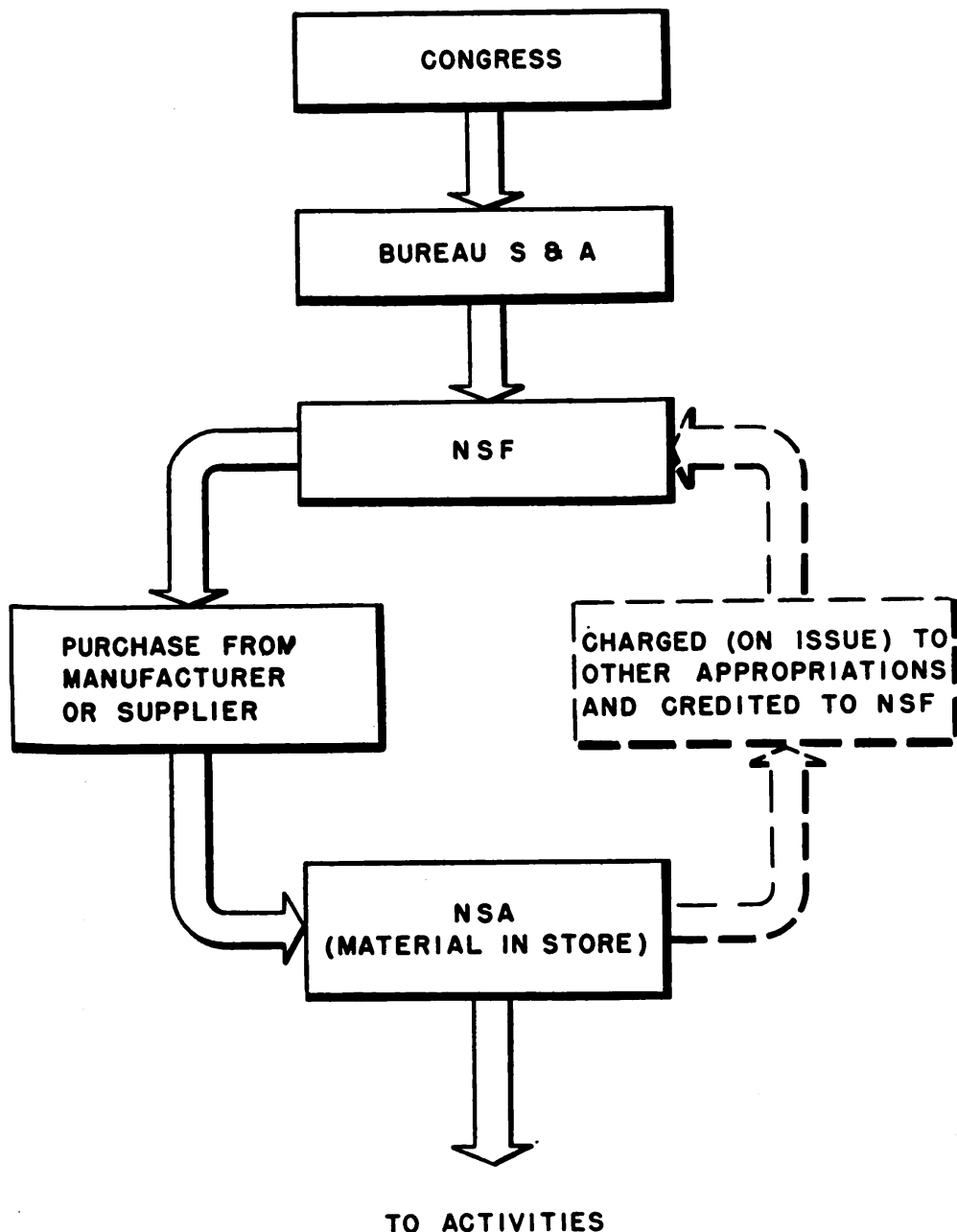


Figure 16.—And NSF works like this.

tions as the material is drawn from the Naval Stock Account (NSA).

The Naval Stock Fund (NSF) is money (cold-turkey

cash) which is used to buy material for the Navy. The Naval Stock Account (NSA) represents stores—material which was purchased by NSF money.

Appropriations for the maintenance, operation, and extension of the Navy are voted annually by Congress in the form of appropriations and special acts.

The appropriations are divided into two classes—CONTINUING APPROPRIATIONS and ANNUAL APPROPRIATIONS.

Continuing appropriations are those which provide a fixed sum of money for a certain purpose, such as the construction of wells, buildings, docks or landing fields. This money remains available until exhausted or until the project has been completed. Any remaining balance is turned back to the Treasury.

Annual appropriations cover the operating and current maintenance expenses of the Navy for a single fiscal year. This money is available for the payment of material received or services rendered during the fiscal year for which voted. It is available also for payment of contracts or obligations actually entered into during the fiscal year, for two years after the end of the fiscal year. Any remaining balance is turned back to the Treasury.

The appropriations are administered by the various bureaus and offices to which they are granted. The appropriations (money) are used to pay for services or material received by the vessels, squadrons, units or other activities operating under the respective bureaus or offices.

STANDARD OR GENERAL MATERIAL is drawn from NSA stock by the various vessels, squadrons, units, or other activities. As this material is drawn from stock, the Naval Stock Fund (NSF) is reimbursed for the value of such material from the responsible appropriation (money).

Technical material is paid for when purchased from contractors by money from the appropriation responsible for the support of the vessels, squadrons, units, or other activities using the type of material being pur-

chased. The Appropriation Aviation Navy pays for technical aircraft material. The Appropriation Ordnance and Ordnance Stores pay for technical ordnance material. Likewise, other technical material is paid for by the supporting appropriation.

As the material which has already been paid for by an appropriation is received from the contractors it is taken up in the Appropriations Purchases Account (APA) and held pending issue to the activities whose supporting appropriation has made payment.

The Appropriations Purchases Account is a stores holding account in which material is held THAT HAS BEEN PAID FOR BY SOME APPROPRIATION. Such material carried in the Appropriations Purchases Account will be issued to vessels, squadrons, units, or other activities operating under the bureau or office for which the material was purchased.

Material that has already been paid for by some appropriation is taken up in the Appropriations Purchases Account.

It was explained previously how appropriations are voted by Congress for the maintenance, operation, and extension of the Naval establishment. It was also shown how standard or general material is drawn from the Naval Stock Account (NSA) storehouses and that payment is made to the Naval Stock Fund. Technical or non-standard material is handled differently. It is purchased directly from the contractors and paid for by the money from the responsible appropriation. This material is strictly technical material such as airplanes, parts and other items that can be used only by certain bureaus.

Figures 15 and 16 should help you to follow the flow of money and materials in the case of these two accounts (APA and NSA).



CHAPTER 5

FORMS AND ISSUE

TRAFFIC COPS OF SUPPLY

What's the main purpose of a traffic cop? To keep traffic MOVING. Forms are the traffic cops of supply. They are designed to SPEED UP THE MOVEMENT of supplies and to make the requisitioning and accounting jobs easier and faster. You'll find these forms ready little helpers. They help to save your own time and energy. You use them for requisitioning and accounting. You use them in ISSUING aviation supplies and equipment, too.

It isn't so necessary that you commit to memory all the form numbers and the detailed way they're filled out. But it is IMPORTANT TO KNOW WHERE TO FIND THEM. A complete list is published in Appendix E to the BuSandA Memo. It will give you a good understanding of how the forms are used in helping Supply Departments control the flow of materials and keep the necessary records for accounting purposes.

You'll find the tools of the Supply Department divided into five different groups. By now, many of them will

be familiar to you, but just so you can better recognize them and see just how they're used, meet them again, first-hand.

MATERIAL PROCUREMENT VOUCHERS are those that are initiated in requesting materials from **OTHER** sources. They're used at the top by **ASO**, **BuAer**, and **BuOrd**.

MATERIAL RECEIPT VOUCHERS cover incoming materials that are received as a result of the procurement.

MATERIAL REQUESTS VOUCHERS are those that are received by the Supply Department asking it to furnish equipment or materials.

MATERIAL EXPENDITURE VOUCHERS show that the materials have been shipped in compliance with the requests vouchers.

BOOKS AND RECORDS are used by the Supply Department in accounting and maintenance stock control for the materials received and on hand, issued or transferred.

You'll find stock cards of untold help in keeping up with materials on hand and their disposition. The cards are officially known by their **BuSandA** form numbers—766, 768, 769a. One card is kept for each item on hand and the cards are filed **BY CLASS** and in stock number order within each class.

That's all right for standard stock, but you'll have to follow a little different procedure for non-standard materials. In the latter case you separate them by class and file them in stock number order under each individual manufacturer. There's a column to show the balance on hand, after you've entered the materials received, the materials you've shipped out or issued, and have made adjustments.

MAKING ADJUSTMENTS

If there were no such things as faulty memories, carelessness, a tendency sometimes to do things the short way instead of the right way, and a good many other human weaknesses, you probably wouldn't need adjustment cards.

Theoretically, the stock on hand, what's posted on the stock cards, and what shows on the class ledger would always be in agreement. But it just doesn't work that way. You'll find these three at odds pretty often. The only way to reach an agreement is to fill out an adjustment card.

Receipt of new NSA material also will take you to those adjustment cards which are numbered as BuSanda Form No. 449. After the additional material is re-



Figure 17.—Stock cards tell location of material.

ceived, you'll have to arrive at a new unit price. This is done by adding the value of the material you have on hand to the cost of the new material, and dividing the total value of the new quantity by the number of units in the new quantity. There'll be a difference between the new and old values and the loss or gain is entered on the adjustment card.

HOW APA AND NSA DIFFER

APA material is accounted for by QUANTITY, rather than money value. You won't have to consider cost of

transportation on material bought from APA, since that is paid from public vouchers under the appropriation. But on NSA materials, you'll have to add transportation costs to get total value and unit value of the stock on hand. Usually, you can get transportation costs off the inspection reports.

In replenishing stock, you'll use your past experience in issuing materials AS A GUIDE. But you can't bank entirely on that, for replenishments now are based more on anticipated needs than on what has happened in the past.

Stock Issues and Obligations Cards, known as Bu-SandA Form No. 447, are used for this purpose. The information you have on what has happened to procurement action on a material is shown on this card. You'll also list obligations against the material.

When you are at a major supply point or some other issuing agency and you receive a request from an activity for some material, you immediately post it on Form 447 to show that it is an obligation. This, of course, reflects the fact that even though the material may still be in stock, it really can't be considered as part of your working inventory, since it's already obligated. When it's shipped you'll note that fact on the card, crossing off the obligation entry.

MORE FORMS

If you're stationed at a point other than ASO or BuAer, or at an activity which does not have a bookkeeping department, you won't have much to do with Form No. 218—the Class Ledger Sheet. These are maintained by the bookkeeping section to show running balance of the money value of stock on hand. The sheets are broken down by classes.

Procurement Vouchers are prepared by the requisition and order sections to obtain stock requested by distribution points and major supply points. They include requests for NSA materials on requisitions (Form

76 which you met earlier), shipment requests, requests for manufacture, and some others. Procurement is made on the basis of your replenishment and ad interim requests.

BuSanda Form No. 14 is another big help to you in making reports on inactive and excess stocks. You'll prepare it at the same time those replenishment requests are filled out, and for the classes you're ordering at that time. These stock reports are filled out even if you don't send any replenishment requests for that particular item or class. You'll include on this report only the items which are suitable for issue. Since it is to show only the EXCESS amount, the quantity will be the total on hand less actual issues during the past six months. In determining your issues, you WON'T include the quantities of excess stock which have been transferred, such as to another supply or distribution point on authority of ASO. When you've disposed of the excess stock, you'll send along a Cancelled Excess Stock Report.

Here's one you'll probably never come in contact with—but it's still part of the picture. INM 10's serve as inspection reports and are prepared by Inspectors of Naval Materials. They also indicate that material has been shipped and the method of shipping. Inspectors of Naval Materials are maintained by technical bureaus to inspect certain items at the place of manufacture.

These inspectors also prepare bills of lading after they have completed their inspections. This is just another safeguard to make certain that equipment and other materials shipped to you at supply points and other activities meet the high Navy standards and are ready for use.

A follow-up, going hand-in-hand with the INM 10's, is BuSanda Form No. 135. This is a report of the DELIVERY of supplies. It is prepared by the receiver's section, to notify the inspection report section that material has arrived and is ready for inspection where it has been received.

Then there's one more report form used in connection

with the inspections. Known as BuSandA Form No. 65, it is filled out where the material is sent, after the shipment has been received and inspected. Usually, examinations are not so comprehensive at the point where the material is received as they are at the manufacturing point.

Receipt Expenditure Invoices, BuSandA Form No. 127, are prepared from shipment requests to show stock number, nomenclature, and quantity of materials to be delivered. If you're the one who prepares the invoice you'll send it to the stores section where the stockman will remove the required item from stock and forward it to the shipping or delivery division. It will go to Delivery if it's to be shipped out locally by truck, and if it's going to an outlying area by common carrier, it will go to Shipping. At the same time the material is sent to Shipping or Delivery, the invoice is routed to the posting section where a price, based on the unit price showing on the stock card, is placed on it and a new balance is posted on the card.

THE STUB'S THE THING

Probably the most commonly used form in all aviation storekeeping is the STUB REQUISITION—BuSandA Form No. 129a. You'll be seeing plenty of this one, for it's used in getting most materials out of store. Shops such as A&R (Assembly and Report) use it as a material request paper. You also find it used as a "material expenditure" paper, having the item listed first recorded in the requisition section of the outgoing stores group. Stub Requisitions should always show either the job number or the account. But they're not worth the paper they're written on unless they carry an authorized signature. As an expenditure paper, the Stub Requisition follows the same routing as other expenditures. It is routed through posting and bookkeeping before finally lodging in the accounting office.

A filled-out "stub" is shown in figure 18.

AND MORE FORMS

If you land in one of those top initiating offices you'll have quite a bit to do with the daily statement of RECEIPT AND EXPENDITURES, BuSandA Form No. 450. It's a letter of transmittal listing both receipt and expenditure vouchers that are being routed from posting to bookkeeping. Usually they're prepared shortly after

STUB NO. 1									
S. and A. Form 129									
BUILDING		DATE		STUB NO.					
VPB -20		DELIVER TO		VP20-861					
210		8/24/45		VP20-861					
STUB REQUISITION									
APPROPRIATION		JOB ORDER OR ACCOUNT							
NAS, Clarktown		Aviation Navy 1945		VP20-9300					
STOCK NO.	DESCRIPTION OF ARTICLE	QUANTITY REQUIRED	UNIT OF QUANTITY	UNIT PRICE	EXTENSION				
A(L)33-P-3828	PLASTIC: Transparent, flame-resisting, 1/4" x 36" x 48".	2	Sheets						
	1								
ISSUED BY	DATE	PRICED AND POSTED	EXTENDED	VERIFIED	AUDITED				
TOTAL									
DELIVER AND CHARGE AS INDICATED									
RECEIVED: (DATE) _____			R. N. Roe, Lieut., USN						
(mo.)			(mo.)						

Figure 18.—You'll see plenty of these.

noon of each day, and you'll list all receipt and expenditure vouchers which have been posted to the stock cards since noon of the previous day.

The vouchers are sorted by class, and are logged under the captions indicated on the daily statement. These captions are identical with those on the class ledger and the class balance sheet. When the vouchers are received in the bookkeeping section they are checked for accuracy and the totals at the bottom of each daily statement are posted in the class ledger. Whereas quantity shows on

the stock card for each individual item, the posting in the class ledger becomes a total money value.

A daily REPORT OF VOUCHERS (BuSandA Form No. 468) is prepared and becomes the letter of transmittal transferring the vouchers from the bookkeeping section to the accounting office. Finally, they become the basis for preparing the accounting officer's balance sheet.

In aviation storekeeping you can hardly say that any one part of the work is more important than another. If you're in the bookkeeping end of it, THAT'S the most important as far as you're concerned. If you're a packager or crater, THAT'S the most important part. Certainly, the actual ISSUING of Naval Aviation material and equipment stands up there with the rest in importance. That's "the gettin' rid of it." And until the material and equipment is actually USED, Supply hasn't done its job.

Issue, then, is more than just getting supplies into the hands of those who finally are getting to use them. It means, too, the accounting for those supplies—and the record-keeping of what finally happens to them.

So issue parts at the top when material or equipment is first shipped from the manufacturer. From there on out, every time the supplies change hands, it's another "issue." All the way down the line you'll have to be on the lookout for in excess and not in excess requests. That goes right down to the point where you're issuing flight clothing to aviators.

EXCHANGING MATERIALS

Aviation storekeepers handle exchanges of equipage as well as issue of materials which are actually consumable. That's another place where they have to be on their toes. Some material can be exchanged. Some cannot.

To keep accounts straight, damaged material usually must be turned in when new equipment is wanted. But sometimes in the past exchanges have been made (new

equipment for damaged) in order to avoid repair work that might have been done on the spot. This abuse of the exchange privilege is to be discouraged, of course.

Exchanges are accomplished by means of EXCHANGE REQUESTS, BuSandA Form No. 675. Take a look at figure 19 and see how an Exchange Request is filled out.

EXCHANGE REQUEST NAV. S. AND A. FORM 675					
SQUADRON VF-6		DELIVER TO BUILDING Hangar 110		DATE 9/26/45	
REMOVED FROM PLANE TYPE F4U2		BUREAU NO. 8213		EXCHANGE REQUEST NO. VF6-1234	
REMOVED FROM ENGINE TYPE R-2800-8		BUREAU NO. 67234		REPAIR REQUEST NO.	
		FIELD Smith		DATE 9/26/45	
STOCK NO.	DESCRIPTION	QUANTITY REQUIRED	UNIT OF QUANTITY	UNIT PRICE	EXTENSION
RECEIVED R82-S-85625	Vacuum Pump Separator	1	No.		
	Assembly				
	THE ABOVE MATERIAL CAN CANNOT BE REPAIRED				
ISSUED					
RECEIVED OLD PART	DATE	PRICED & POSTED	DATE	TOTAL	
ISSUED NEW PART	DATE	VERIFIED	DATE	REMARKS	
RECEIVED NEW PART	DATE	EXCHANGE AND CHARGE AS INDICATED			
(SIG.)	ROY ROGERS, Lieut. USN				SIGNATURE

Figure 19.—Exchanges call for record-keeping.

You're authorized to make exchanges of all equipment in the old Title B ("bring-it-back") category in Classes 81, 82, 83, 85, 86, 87, 88, and 89. Also, you can exchange all aviation ordnance equipment and flight clothing.

You never make exchange of materials charged to NSA. Neither do you trade aeronautical photographic material, aerological material, or material in the custody of Naval Reserve Units. From time to time there may be other restrictions on exchanges.

When material is to be exchanged you receive a damaged or used item and then issue a similar new or re-

conditioned item. Be sure that damaged or used material is accompanied by a "no price" Returned Material Credit Memorandum, BuSandA Form No. 297a. This is really a Stub Requisition in reverse. One is shown in figure 20. A written, informal statement telling how long it has been used, the service it performed, the re-

S. and A. Form 297a		DATE		STUB NO.	
VPB-7	RECEIVED FROM Hanger 120	RETURNED MATERIAL CREDIT MEMORANDUM		10/25/45	VP-3210
ACTIVITY NAS, Jonesville		APPROPRIATION Aviation Navy 1945		CREDIT JOB ORDER OR ACCOUNT VP7-9301	
STOCK NO.	DESCRIPTION OF ARTICLE	QUANTITY RETURNED	UNIT OF QUANTITY	UNIT PRICE	EXTENSION
3-R-143	RACK, bomb, Mark 35-5	24	No.		
DISPOSITION No longer required - Return to Salvage					
AUTHORITY NavOrd OCL V14-44.					
ORIGINAL VOUCHER NO.					
CHECKED BY	DATE	PRICED AND POSTED	EXTENDED	VERIFIED	AUDITED
				TOTAL	
DELIVERED TO			DELIVER AND CREDIT AS INDICATED		
RECEIVED: IDATEL			(SIG.) J. C. Doe, Lieut., USN		

Figure 20.—RMCs accompany returned material.

pairs required, or any other pertinent information, should also accompany returned material.

If you're afloat, you will carry the returned, damaged part on your stock records. If you're ashore, you carry it on the books at the price listed for the article you issued in exchange.

But damaged materials are no good to you or to anyone else in Naval Aviation until they're repaired and ready for use again. Turn them over to an A&R Shop for repair, but when you do that, get a CUSTODY RECEIPT to retain until the repaired item is returned. When damaged items are beyond repair they are expended to "survey."

Accounts to which materials are charged vary widely.

Gasoline drums that have been placed in service are carried in the Appropriation Purchases Account. No charge to an appropriation is made when issues are made from the Appropriation Purchases Account.

Aviation gasoline and oils are charged to Appropriation Aviation Navy and to the vessel concerned. When NSA material is issued to aircraft carriers or tenders, the value is expended 75 percent to Maintenance, Bu-Ships, and 25 percent to Appropriation Aviation Navy and to the vessel concerned. Technical aviation material is expended to the vessel concerned and to Appropriation Aviation Navy.



CHAPTER 6

RECEIVING, STORING, PACKING

CARELESSNESS IS COSTLY

You've probably looked for packages at one time or another from some faraway point. Maybe it was to be a box of candy, a tempting birthday cake, a set of military brushes or some other item—larger or smaller. And just when you had your expectations at a high pitch, you would receive the box. The corners would be crushed in, perhaps part of the wrapping would be gone. Sometimes, the article itself would be missing, or so damaged that it might as well have been missing. And you probably heaped mental curses upon the careless packager "back there" who did such a sloppy job. In your case, the loss was strictly personal, though none the less disappointing.

But when you get around to handling aeronautical materials—aviation stores—you're up to your neck in a life and death job. The aviator or squadron who doesn't get a piece of equipment still sound and ready for use isn't just temporarily disappointed. The whole plan of a battle or some other action may be completely disrupted just because some storekeeper or group of storekeepers get careless in packaging materials and equipment.

And packaging isn't the whole story. It's just as important to know how to STORE materials and equipment. It's all part of aviation storekeeping. Sometimes you receive stores that have to be checked, unpacked, and stored. Sometimes you must remove stores from storage, pack them, and check them out. Often, you have to issue materials and equipment from storage for immediate use—and if you don't know how to find them you waste endless hours of time in searching. Time is the essence of success in war-time Naval Aviation!

There are several obvious reasons for proper storage. If stock tags and records are used, stock can be identified, moved, and issued without delay. Systematic storage makes it possible for you to issue items even if you're not familiar with them—but aviation storekeepers try to be familiar with just as many items as possible.

Inventories are speeded up and made easier when stock is properly stored. Slow-moving items are easy to find and you therefore have a better chance to make suggestions for substitutions.

At larger stations you will find storage divided into several SECTIONS, each of which is responsible for a class or a group of related classes of stores.

TERMS YOU USE

Here are some of the more common words or phrases that you and every other Aviation Storekeeper will use in connection with stowage.

BINS are made up of parallel shelves, one above the other which are divided up and down by partitions called "inserts."

BULK SPACE is space set aside for the size or "bulk" of an article from which supplies are drawn for issue or shipment in large quantities. It is also used for the replenishment of issue bins and reserve bins.

AN ISSUE PACKAGE is one that is suitable for issue and often is the commercial package as received from the manufacturer. However, some manufacturers' pack-

ages often contain a larger quantity of the item than is included in the Navy issue. These must be broken open and repacked as issue packages. An issue package is a unit of issue, whereas a bulk package sometimes is the unit used by the manufacturer in selling or packaging.

A **LOCKER** is a safe, vault, or locked cage used for storing articles of value, such as silver services.

LOT is a quantity received and stowed at any one time.

RACKS are frameworks to hold articles whose predominant dimensions are length and width, or length alone, such as metal bars, metals in sheets, pipe, or tubes.

Articles in store that are, in all respects, fit for issue are **STOCK**. You find several kinds of stock—standard stock listed in the Federal Standard Stock Catalog, local stock items used only at your own station, special stock required for special work, miscellaneous stock accumulated from various sources, retail stock carried in retail bins, racks, and other spaces for ready issue, and bulk stock which is full and unbroken packages from which retail stock is replaced.

STOCK TAGS are standard and you attach one to every item of stock. On each tag you list the stock number, nomenclature, the unit of issue, and any other necessary information.

STOWING is putting stock in its proper place according to the proper method.

UNIT usually refers to unit of issue rather than unit price. It can be by number, dozen, fathom, gallon, pair, pound, or by other unit of quantity designations.

WATCH FOR THE VOUCHERS

You have to be on constant watch for papers arriving with supplies, for you **CAN'T** receive any material without a voucher. The papers can be Incoming Store Invoices, Inspection Reports, Receipt Reports, Returned Material Credit Memoranda, Material Exchange Vouchers, or Class Transfers.

You sign for the material on the receiving voucher.

If you get the material on an Inspection Report, find the receiver's tags and make sure that the receiver's number from the IR or the report of delivery of supplies corresponds with the inspector's tag on the box. If the material comes from the receiving division, the receiver's number is listed on the accompanying paper.

When material comes from a manufacturer, you find a tag listing the type, contract, item number, quantity, part number, and part name. Unwrap the material, but DO NOT remove any preservative. Delicate instruments, however, should not be unwrapped, but should be left with the inspector's seal unbroken.

Each piece should be checked carefully against the receipt vouchers for the part or stock number, nomenclature, and quantity.

It's well to remember that SEVERAL people will use that same paper for check-off and other purposes. So keep your pencil away from letters or figures. If others can't read the record, errors are sure to follow.

Put small containers in larger ones and label or tag the larger ones with the stock numbers and quantities. Also put down the date the material is received, the Inspection Report number, and then your initials.

On the Inspection Report, be sure you show the class number and the date on which the material was received.

You've already become acquainted with Stub Requisitions, Shop Stores Replenishment Requisitions, and Returned Material Credit Memoranda, so you know that one or the other of these must be received before you can issue any material or equipment. Be sure to check the date, number, signature, part or stock number, and nomenclature against the material issued. You can issue only one class on each stub and both APA and NSA material cannot be issued on the same stub.

When you receive one of these forms, sign it when the issue is made, and have your customer sign it, too. The customer keeps one copy. Two additional copies go to the posting section for pricing and for forwarding to bookkeeping for final accounting.

Some materials in store, waiting to be issued, must be inspected periodically. This is especially true of instruments. When inspection shows the materials not fit for issue, send them to salvage and charge them to Class 265. If they're bulky and must be repaired, hold them in the storeroom until A&R is ready to receive them. Clear the papers, however, through salvage.

When you receive material on a Returned Material Credit Memorandum, check the form for signature, stock or park number, and quantity. The inspector passes on the material and if it needs repair, put it into Class 265

ROW A	43-B-50	43-B-51	43-N-50		43-S-50	43-S-141
	43-B-52		43-N-51	43-N-52	43-S-142	
	43-B-53		43-N-53		43-S-143	
	43-B-55					⊙

Figure 21.—Empty spaces allow for expansion.

for salvage. Sign the RMCN and give the person returning the material a copy as a receipt. Two copies are sent to the posting section in the stock upkeep office.

A RIGHT WAY TO STOW

The system of stowage most commonly used in the Navy was named for its originator, Admiral Hicks. Under the Hicks system, stock is arranged from left

to right—top to bottom, alphabetically and numerically, according to stock numbers. This is illustrated in figure 21. One of the features of the system, you will note, is to leave every fifth bin empty. Why? To permit room for EXPANSION.

The Hicks system is widely used for what you come to refer to as “retail stock”—stock removed from the boxes in which it was shipped by the manufacturer. Bulk stock remains in the manufacturers’ shipping boxes and is used to replenish your retail supply.

Before going further into storage, here are a few safety precautions to observe and remember.

WEAR GLOVES OR SAFETY SHOES or both when handling heavy or sharp material.

KEEP OUT FROM UNDER cranes and hoists.

DON’T OPERATE unfamiliar equipment.

KEEP AISLES FREE of debris.

DRIVE OPERATING EQUIPMENT WITH CARE.

REPORT BREAKS in the deck immediately. They can cause accidents.

You’d probably observe all these cautions (and others like them) without being told. This is just a little extra reminder.

To get back to the storehouse layout, it’s handy to think of good bulk stowage as being just like a well-planned city, with aisles crossing at right angles like city streets.

You’ll want nice, wide aisles so you can operate your fork trucks with ease. Fast moving of stock in bulk depends on palletizing, so that fork trucks can be used to best advantage.

Aisles to accommodate 4,000-pound fork trucks should be 12 feet wide. Fourteen-foot aisles are needed for 6,000-pound fork trucks. It will save you plenty of headaches, too, if those wide, convenient aisles are provided at the outset.

You will WANT to leave room between bulk stock rows. Passages should be at least three feet wide, and two or three inches should be left between the different items.

When you wind up with some incomplete packages after breaking manufacturers' package down to issue size you'll put them in their proper retail bin with all the necessary information about the package placed outward.

TAILOR BINS TO FIT MATERIAL

You have to decide the size, shape, and general character of each retail bin mostly by the contents of an ordinary issue package. You can adjust the proportions of the bins by the use of dividers.

All the contents of an issue package of the first item of a class go in the first upper left bin in the space assigned for that class. On that bin you place the

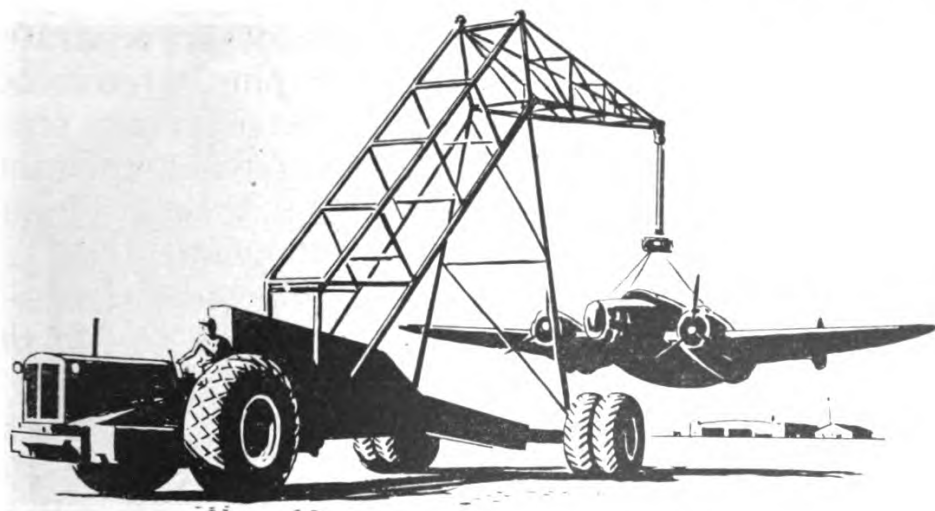


Figure 22.—It isn't this easy at the front.

small retail stock tag of the first item, giving the stock number, nomenclature, and unit of issue exactly as they are on a stock card. You follow this procedure right on through—always building from left to right and from top to bottom. Stock is not segregated by accounts, so the bin of an APA stock item will immediately follow the bin of an identical or similar NSA stock item.

Because of bulk, length, or weight you won't be able to get ALL items into standard retail bins. Those that

won't fit must be stored elsewhere. The correct tag for each one, however, should be placed on a small, empty bin or below the tagged item in an occupied bin, always following the alphabetical numerical order. On the back of the tag you show the exact location of the missing item.

Bins for some classes of retail stock are not practical. These include major structural spares which you can arrange in rows on a floor, item by item. Much of this stock can be kept on dust boards, three feet by six feet in size. They are built to keep the material two inches off the deck. For still other classes or parts of classes, you have to construct special racks, tables, dark rooms (for rubber items), and so on.

You separate different lots of the same stock item. If they're in the same storage space the lots are separated by a space of at least one inch when in bins, three inches when on platforms. Each lot should have its own separate tag and lot number and whenever possible the same item should be piled the same way so that each column, stack or block will contain the same quantity.

Sometimes—particularly at far advanced bases—you're going to find yourself doing a great deal of the arranging work by hand, but at most spots you'll find a lot of mechanical helpers including cranes, fork trucks (finger lift), commercial trucks, tractors, electric elevators for lifting the stock, high steel tables with rollers, high and low lifts, hand trucks, and other equipment. Where mechanical aids are not available, you have to resort to your own ingenuity and devices to get the stock where it ought to be.

ALL material must be handled carefully. Special care is required for compressed gas in cylinders, alcohol, gasoline, delicate instruments, and acids.

PLAN IT FIRST

If you're laying out a new storage area or rearranging an old one, you can save yourself and others a whole lot

of future grief by giving the **PLANNING** some careful attention before you start work. Excessive carrying charges and operation expenses plus the expense of future rearrangements of stock can be eliminated, by doing the job right the first time.

Make sure that you utilize to best advantage the total cubic space you have available. Once again, this is a matter of planning ahead, and taking a good look before you leap.

Although they won't always apply when you're 'way out in front at an advanced base where most everything has to be done with little help from the book, here are



Figure 23.—Planning ahead saves future grief.

some pointers on planning. Classify and list items to be stored according to measurements, difficulty of handling, frequency of issue, quantities to be carried, and other special considerations. Determine how much aisle space you need and decide on the proper layout for storage space and passageways. In planning storage buildings, particular attention is always paid to the location of entrances, posts, platforms, windows, and other necessary features that either help or hinder easy handling and stowing.

When you plan stowage afloat, your main considera-

tion will be the locations of hatches and storerooms and how easily and best they can be reached. Accessibility—both in receiving and issuing stores—and adequate protection against loss or damage are the chief considerations when planning stowage afloat. Ventilation and dryness are important, too.

The ideal storage arrangement would be to have no vacant space and at the same time to have neither congestion nor unaccommodated items. But that would be another storekeeper's Utopia.

You HAVE to plan for a certain amount of vacant storage space to take care of a reasonable degree of expansion. But any more than is necessary is dead loss. Military movements and fluctuations in stock—particularly in aviation—often make dead loss unavoidable. From a practical and an economical viewpoint, however, too much space is preferable to too little.

If you wind up with your storage area overloaded and too little room to get around, the stores are likely to be damaged. You make errors in counting and checking. You lose time in unpacking and making issues. These losses frequently outweigh the losses due to unutilized space.

You find that use of a standard rectangular unit as a basis for the layout of GENERAL storage areas gives you more flexibility in arranging space. Palletize everything possible. Flexible steel storage equipment or wood bins and shelving of standard dimensions are best.

The structural strength of the deck space has to be considered, too, and your Public Works Officer can set you straight on that. You have to figure your live load (stores) so that it does not exceed the pounds-per-square-foot weight limit.

The space you allot to any one item should be at least enough to hold the maximum quantity expected at any one time. A better plan is for the maximum quantity to occupy only about 75 percent of the available space. If you figure—or know—that the normal lot would occupy one and one-half rows, and that a new lot usually

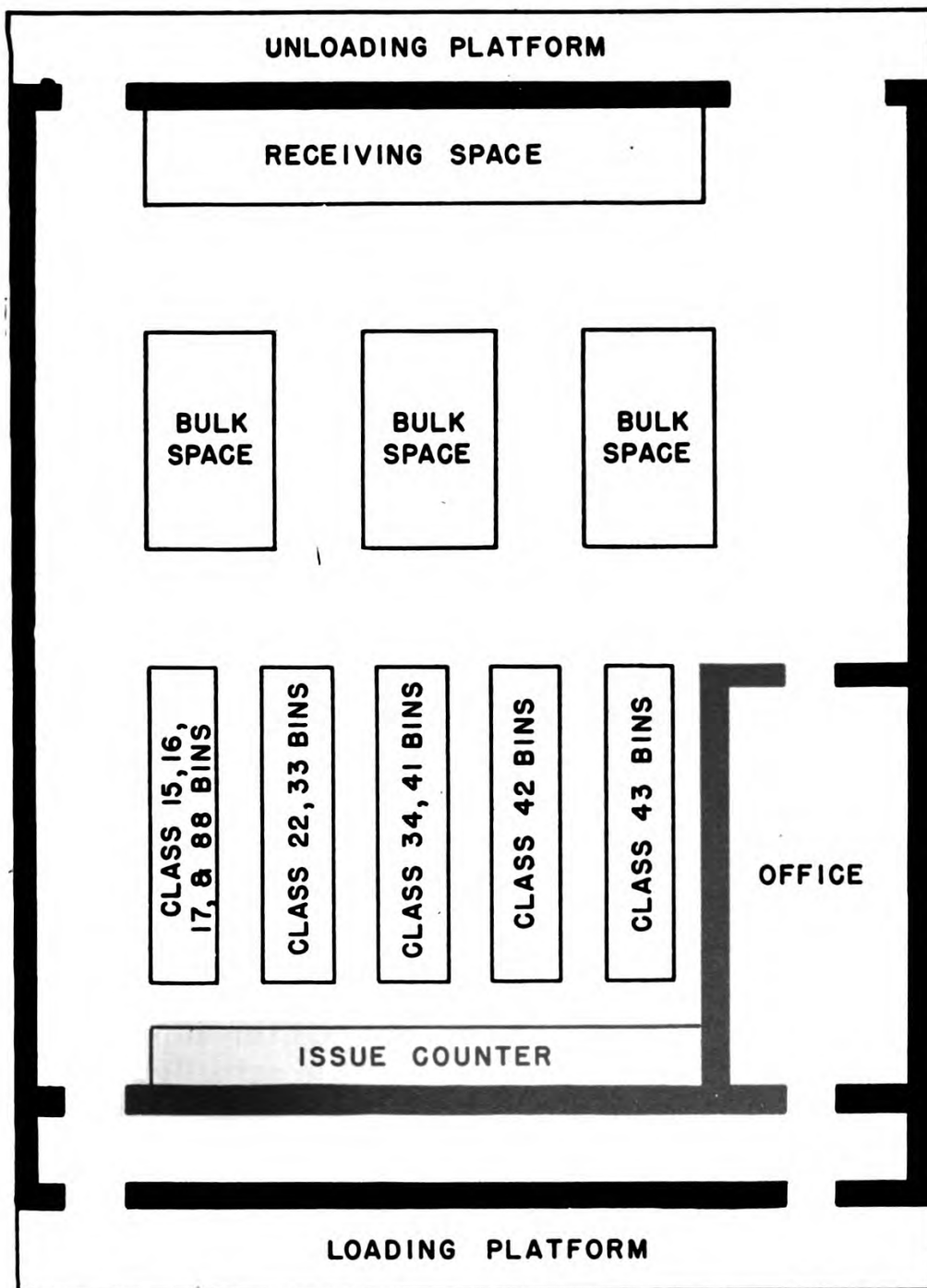


Figure 24.—Model storerooms have ample aisle.

arrives when one-third of the previous lot (or one-half row) remains, the total space for the item should be two rows.

Generally, it is advisable to have two-foot fire passages along all bulkheads where you use “block pil-

ing” or where stacks run parallel to and join the bulkheads. But this is one of those questions which must be left pretty much to local conditions. Fire passages are less necessary when stacks, with side aisles between every two, run at right angles to bulkheads. In this case you can get to the wall space every two feet anyway, and can easily and quickly remove packages next to the bulkhead.

THE DECK PLAN

Where you don't have to worry about the stress on a deck, such as in a modern reinforced concrete structure, aisles should be of whatever width needed for passing and handling material. Main aisles for two-way passing of fork trucks need to be 12 or 14 feet, sometimes even more. Side, connecting aisles, or those which run straight through the building for one-way traffic, need to be only conveniently wider than the trucks themselves.

Side aisles used for trucking and ending in a wall should be wide enough to allow the truck to turn around. Where goods are packaged and are being handled by hand, you can use the standard 30-inch aisle width between bins and shelves.

Since there are usually several buildings included in a shore-based supply group, you will have to follow a system of identifying them. You need this information on the stock cards, as well as to help in actually locating buildings, decks, and sections of decks. A simple method is to indicate the storehouse by a letter, and each deck by a numeral, with the number preceding the building letter. Then assign an additional numeral for each section on each deck. In that way, the tenth section on the third deck of Building “C” would be indicated as 3-C-10. If you need to break the system down to include rows and bins, you can use additional letters and numerals.

Take a look at figure 24. It shows a model floor plan.

Whenever possible, obtain all the storeroom equipment and appliances you can. They save time and energy. They are of extreme value when the supplies

have to move out in a hurry. Fork lift trucks, electric trucks, tractors, gravity conveyors, weighing machines, computing scales and similar equipment is practically worth its weight in gold. One thing you'll have to be certain of is that weighing machines are periodically and frequently inspected and tested. They're no good at all to you—in fact, they will throw your whole record and inventory system out of line—if they are not accurate.

PILING IT UP

When you're stowing goods, you can save space by tiering in cubical stacks and blocks. Stack as high as possible, considering stability and deck load limit. In

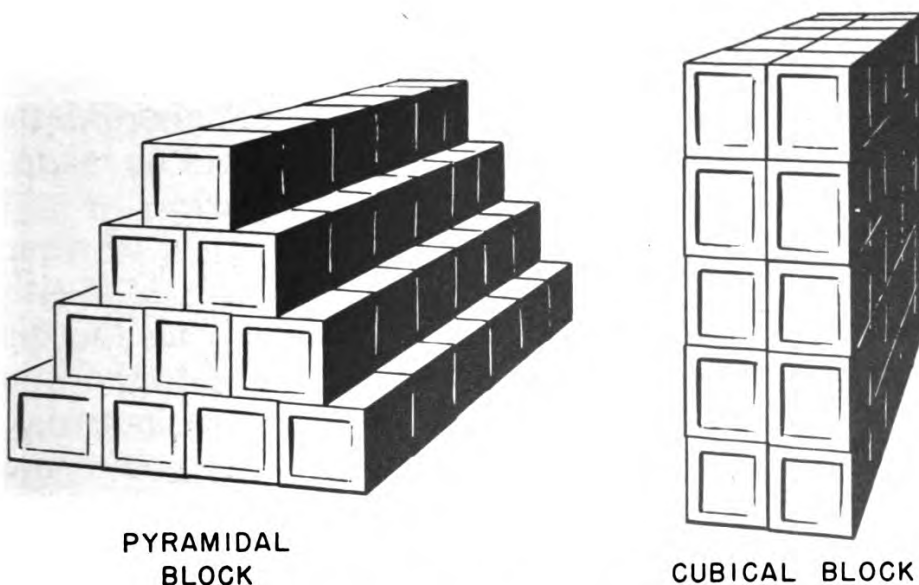


Figure 25.—Piling should be orderly.

this way, you have a maximum area for different groups and kinds of articles. When time and effort are the primary considerations, tier the goods only as high as an average man can reach. Five feet to the top of the next to last tier is a normal height for packages weighing not more than 100 pounds.

The cubical method of piling is usually better to use

than the pyramidal method. It saves space. It is easier to keep uniform, to inspect, and to count. If the stowage is in the open and uncovered, there's less spoilage from weather.

Pyramidal piling has two advantages. You can secure tiers of cylindrical or other rolling articles such as shells, by bracing only the bottom tier of the stack. If you use cubical tiering, material has to be braced to its full height. Pyramidal tiering is easier to cover from the weather, because of its shape.

Right ways of piling are shown in figure 25.

Here's one rule that's pretty much a law among Navy storekeepers. Pile your material either singly or in multiples of five. You can pile singly up to 10 in a column. Beyond this you can make the columns as high as the space and allowable live load will permit—but only in whole groups of five. Unless you're really pushed for space, never break a group to fill in a little remaining space. For instance, if a bin holds 24 packages of letter-heads piled snug to the top, the column will be made of only 20 packages—four groups of five each.

It's better to place goods all one way than to reverse or cross-pile them. If you do reverse them, do it either singly or in groups with the dimensions lying the same way. Laying goods in a tier at right angles to those just below (cross-piling) increases the stability, but makes it more difficult to get to them. Besides, you're more likely to make an error when counting them.

In some cases you have to provide for ventilation, as in the case of piled lumber. Then you use crossbars to separate each COURSE. By doing this, the goods in all the courses may lie the same way. You'll find it best for goods to lie with their ends out toward the aisle into which they will be withdrawn. If, however, you can save 25 percent or more space by following some other method, use it!

If you keep all columns, stacks, or blocks uniform, your storeroom will be neater and you'll do your counting much more easily. Only the last column, stack, or

block of an item should be incomplete and contain odd quantities.

BRANCH STORES

The A&R Shops at most Naval Air Stations cover considerable territory and include many buildings. They're seldom close to the buildings of the Supply Department. Plenty of time would be lost and a good many workers would be required to serve as stock chasers unless stock was made available in various shops and buildings.

So shop stores are maintained to carry an adequate supply of regular items that are used in particular shops. Sometimes you find more than one shop in the same building. Usually there's a general shop store, in addition to those carrying items for particular shops.

The general shop store carries a supply of material such as bolts, nuts, screws, washers, and rivets which can be used by all shops. In this way a shop need draw no more material than it actually needs for a job.

An Aviation Metalsmith, for example, might need 17 rivets to repair a PBY tail section. He can go to the shop store and draw 17 rivets. If he obtained them on a Supply Department stub, he'd have to draw one pound of rivets, the unit of issue.

One thing to put down in the book right now is that aircraft, either assembled or not, crated or uncrated, should never be stored in the open except for short periods. They belong in dry spaces that are equipped for ventilation. In cases where open air storage can't be avoided, cockpits and engines must be properly covered and steps must be taken to protect other exposed parts such as the wing folding section and landing gear. In forward areas which are subject to attack during wartime you store aircraft in revetments and camouflage them.

Assembled land type airplanes are placed in storage when you're to have them for longer than two weeks. You use blocks, horses or other devices under the strength members to take the weight from the wheels.

Seaplanes and boats should rest on cushioned trucks or on the handling gear designed for and furnished with the airplane or boat. If you use padded trucks, be certain they're properly shaped to fit the lines of the floats or hulls, and be sure, too, that the pads are dry when you put the floats on them.

Sometimes you can sling airplanes from hangar overheads. Believe it or not, one thing you have to guard against is birds. The little chirpers may be pretty to look at and may sing sweet songs, but they and their families and homes can play havoc with a fuselage. You will have to persuade them to find sanctuaries elsewhere.

Naturally, every precaution possible must be taken against dust and dirt.

STOWING AIRCRAFT

• Because aircraft and aeronautical materials are usually costly, because they are not as rugged in many respects as other supplies and equipment, they require plenty of ATTENTION when placed in storage.

When an airplane is removed from operation, you drain all gasoline, oil, and water from its tanks before you place it in storage. You dry the fuel tanks with compressed air and then plug all tanks. If you're storing seaplanes, you wash them down inside and out with fresh water to remove all salt deposits. If possible, the fuselage fabric is unlaced to make cleaning easier. It is left unlaced to allow easier periodic inspections. Landplanes are cleaned of all accumulations of dirt, especially inside the fuselage near the tail and around tail surface hinges.

Cables should be greased, and unpainted steel parts should be coated with a rust-preventive compound. If you find an area of steel or aluminum alloy where the paint has been worn or chipped off, wire-brush the section until all corrosion is removed and touch it up with protective coatings specified in the latest issue of Navy Aeronautical Specification SR-15.

You treat new airplanes and spare parts in storage the same way, except that you won't have to wash them, unlace the fuselage fabric, or touch up unpainted parts. You do grease all bare steel parts and all cables, however.

When you're storing an airplane for more than seven days, the engine(s) should be prepared as indicated in the latest revision of Specification SR-78. Remove the storage battery from the fuselage and place it on "trickle charge." You may have to remove the engine(s) to follow specifications and when you do, it's up to your

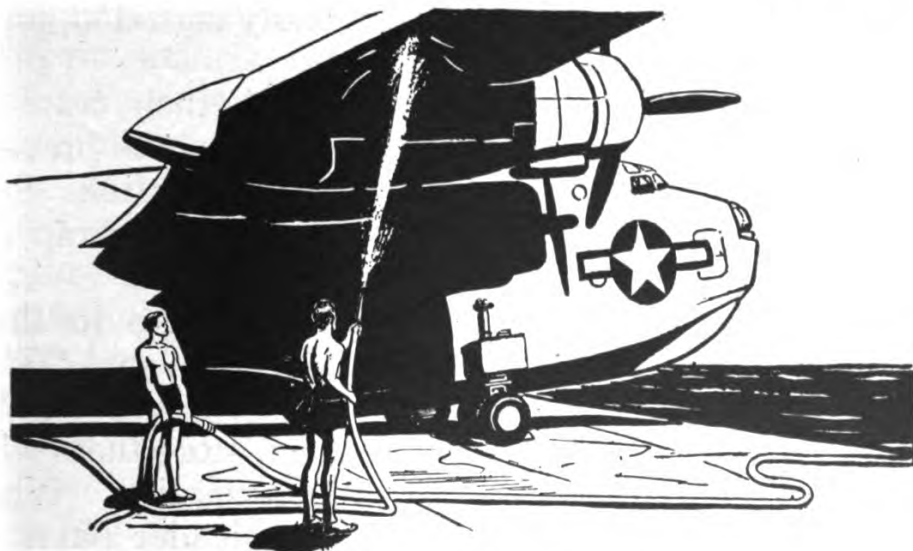


Figure 26.—Salt plays havoc with aircraft.

Commanding Officer to say whether or not you reinstall them. If you're storing an engine for 12 months or more follow Specification SR-78 to the letter.

Clean the propellers **THOROUGHLY** and give them a coating of oil. Disconnect fuel lines and fill them with a light motor oil so that the mechanisms of engine-driven pumps, hand pumps, valves, and strainers will be immersed. Plug the ends of the lines.

Store landing gear struts in their disassembled condition with the packing adjusting nuts backed off to relieve the packing of all pressure.

You have to give crankshafts a little special attention. If they're prepared for temporary storage, you have to

run them through three complete revolutions once a week. Do this BY HAND—never by mechanical means. You don't need to do this on engines which have been prepared for long storage. In any case you should operate throttle, spark, mixture, and shutter controls over their complete range at least once a week.

To prevent corrosion, flush all stored fuel and oil tanks with light motor oil at the first opportunity. Then make periodic inspections of the interiors. If corrosion shows up, clean the tanks with an approved cleaning agent and take whatever steps necessary to prevent further corrosion. If the tanks are badly corroded, have them repaired or surveyed.

Remove fabric-covered surfaces from their crate as soon as possible after delivery and store them to prevent warping and to provide adequate air circulation. Suspend stabilizing surfaces of airships by their strap fittings when placing them in storage.

You can store hulls, floats, and fuselages in their crates, but with the top and one side removed. This makes examination for weather exposure and regular inspection easier. If you uncrate them, store them with the load distributed to prevent deformation. When you're storing struts and other long, slender parts be sure that they are supported so that no warping or curvature can develop.

Tag tie rods to show their correct location, and when you store them be sure that they won't get scratched, nicked, or in some other way damaged through contact with each other.

When practical, have salvaged parts reconditioned before placing them in storage and then treat them just as though they were new materials.

You find some ships and stations carrying stocks of aluminum alloy to be used on Naval aircraft. Give this material a light coat of some approved rust-preventive compound before storing it. Use a light coat of oil on aluminum alloy props when there is no rust-preventive available.

One thing that's important in storage is the condition of buildings. They should be kept as dark as possible. Windows and ventilators should be open in dry weather. In the tropics, buildings or parts of them used for storage of aircraft should be dry and well-ventilated. NEVER store aircraft or parts of aircraft on the deck or on the ground in the tropics. Storing of aircraft material in a hot climate with a high percentage of humidity is a ticklish business!

Impulse charges for cartridge-type aircraft engine starters are stowed in the same way that you handle small arms ammunition. Afloat, stow them in small arms magazines. When ashore, place them in any dry, cool storage space suitable for stowage of small arms ammunitions. Never keep them in storage for more than two years. Be sure, too, that they're never subjected to a temperature of more than 90°F.

Store all ignition cable not packed in sealed containers at a temperature between 70 and 75°F. All cable reels in storage should be tightly wrapped in waxed paper to retard evaporation of the plasticizer from the lacquer coating.

INSPECT IT REGULARLY

You always have to guard against deterioration of aeronautical equipment and materials. This can best be done through frequent inspections.

Men who have had training in aircraft construction or in the care of aircraft material are best qualified for these inspections, and when they aren't available in the Supply Department, your Commanding Officer will detail them from some technical department. In shore establishments, inspections should be conducted at intervals of not more than 30 days.

In general, inspections should include major and minor structural parts for misalignment, skin fractures, and abrasions, skin corruptions, corrosion of hinges, and all attaching parts. Engines are checked for corrosion, moisture, and to see that preservatives are still effective.

Oil and fuel tanks are given a close scrutiny for external corrosion of skin and threaded fittings, and for internal dryness. Except for self-sealing fuel cells, the tanks should be flushed periodically with a light flushing oil.

Look out for dust and dirt on working parts and keep all those accessories covered. Spark plugs should be in a special locker and kept dry by electric lamps and sodium chloride.

At major stations you find special storage places for some items—but on many an advanced base or dependent activity you have to do the best you can to preserve supplies and equipment and protect buildings and the rest of the men against danger.

Just to give the next fellow a better chance for a long life it's a good idea to place paint, dopes, lacquers and the like in specially constructed warehouses, away from danger areas. Where possible, you use automatic fire doors on these warehouses and protect the materials with CO₂ systems.

Oil drums usually are stored in oil "farms" on special handling racks. Oxygen, helium, and acetylene are stored in cylinders at approximately 2,000 pounds per square inch pressure. And keep these last out of direct sunlight. If you're looking for a few don'ts, DON'T mix oxygen and acetylene. And DON'T put grease on oxygen valves.

You don't need to be told that gasoline is volatile and explosive. You can be poisoned, too, by breathing its vapors. Piping and tanks should be inspected daily for leaks, and if you and your mates want to enjoy a ripe old age, it's best to be plenty careful with tools around those pipes and tanks. Neither gasoline nor kerosene are stored in hangars—there are special tanks and containers for them.

NO SMOKING

When fueling, be sure you follow the book on establishing grounding wires. Anybody connected with avia-

tion storekeeping should know enough not to smoke, carry a naked light, or have an exposed electric switch within 50 feet of aircraft being fueled or within 50 feet of gasoline tanks. If you find a person who doesn't know or follow the rules, give him the word.

Except in specially-designated rooms, smoking in hangars or other buildings where major aircraft parts are stored is not permitted. And if you happen to get your clothes saturated with gasoline, get 'em off just as soon as you can. Until then, you're a fire hazard and the liquid can injure your skin and flesh.

Always find a cool, ventilated storage space for rubber items. Photo materials go in chilled boxes, painted black inside and kept in the dark. Flight clothing goes in

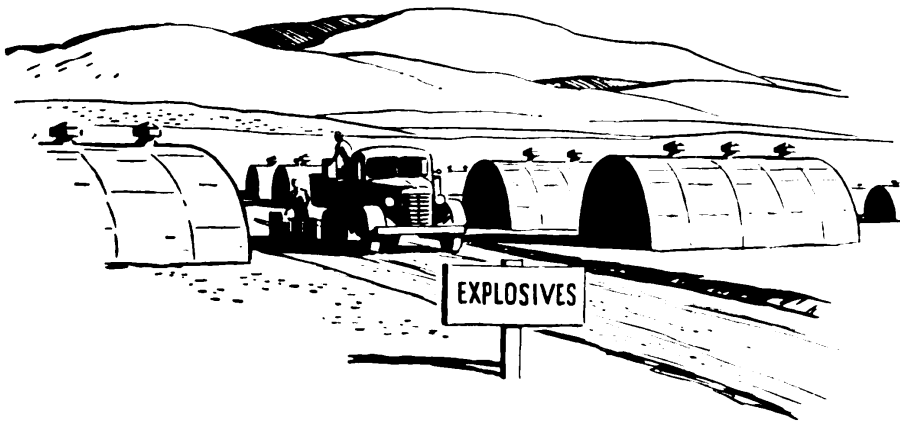


Figure 27.—Many supplies require special handling.

chilled storage rooms where at regular intervals the temperature can be brought down to freezing as a protection against moths.

TAG IT

Stock is identified with TAGS. These come in different colors and in different shapes. One thing that helps everyone in storekeeping is an identical inscription on each stock tag, both in retail and bulk and on the corresponding stock cards.

Retail stock tags are round with metal rims and should have strings. White tags for standard stock and

green for local stock show stock number, name of item, and unit of issue. Red and yellow tags for special stock and miscellaneous stock, respectively, show the stock number, name of item, unit of issue, and any special information. Blue tags for surplus stock show the stock number and the surplus-list number. Salmon and "Reserved" tags, for survey stock and for stock set aside for unusual purposes, respectively, carry data to identify the whole item.

Stock in bulk does not always require tagging. Often, stenciling on the containers is better. Tags when used, however, are 6 inches long and 3 inches wide, with strings. If bulk stock tags are used they should show first, the quantity in the container, followed by the unit of issue, if any, and the description of the material. So, if you had four dozen pairs of gloves made for a specific purpose, your tag on the container would say "48 Prs. Gloves, driving, gauntlet, woolen, size 9."

TREAT THEM GENTLY

On some occasions you will receive aircraft instruments which have been immersed in water for shipment to an overhaul base for immediate repair. You can't just tie a shipping tag on them and let them go. Because of their delicacy, they need as considerate treatment as you'd give an infant exposed to cold and possible pneumonia.

You have to open the instrument case and disassemble the mechanism. Then you flush all parts of the instrument with an approved water-displacing rust preventive. You can do this by using a three or four gallon container, or you can fill the instrument with the compound in any manner that's convenient. Shake the instrument vigorously to be sure that the compound gets to all parts of the mechanism. Drain off the liquid so that water does not settle in the bottom of the instrument case. To be doubly certain that the operation is effective, repeat it twice, and let the mechanism drain and dry. Then care-

fully pack the instrument with all the removed parts, and ship to the overhaul base. Be certain to write "Immersed in Water" on a tag on the outside.

On navigational watches and stop watches, open the back to expose the mechanism before you treat them.

The glass on clocks should be removed and any screws in the back of the case should be removed so that the flushing will be thorough on all parts.

Before giving gyroscopic instruments the protective



Figure 28.—Tag everything!

treatment, it's best to partially disassemble them. If this causes too much delay, treat the entire instrument with the cover glasses removed.

Sometimes, you can carry out flushing operations without disassembling gyro instruments. Immerse the instrument completely in the rust preventive compound and connect a vacuum supply in series with a glass bottle trap to the vacuum fitting of the instrument. Plug all the connections on the instrument, except the air inlet supply and the vacuum fitting. Immerse the instrument in such a way that the vacuum fitting will be higher than the rest of the instrument.

It will be filled with rust preventive when the compound has entered the trap. Shake the instrument vigorously and let the liquid drain. The trap can be made with a glass bottle filled with a two-holed stopper. One of the holes should be vented to the vacuum supply and the other to the vacuum fitting of the instrument. The trap prevents water and the flushing compound from entering the vacuum pump.

You have to use your own judgment—and that of operating personnel, too—in deciding whether or not instruments should be given emergency protective treatment. Two things to consider are the time available for salvage and treatment and the cost of the instrument. Sometimes, you find that trying to salvage all instruments will interfere with salvage of the very costly equipment. And never is instrument salvage to be carried out at the risk of your health.

CRATING AND PACKING

When you get around to crating, uncrating, and packing aviation materials and equipment, you discover that here again you're in one of the most IMPORTANT PHASES of aviation storekeeping. The best manufactured aeronautical item in the world is worthless if it's packed or crated in such a way so that it gets to its destination battered to pieces. Edgar A. Guest once summed up the situation in a poem called "The Lesson of a Crate." Here it is.

It seemed an unimportant task, too trifling for a chief to ask,
A little thing, nor could he see, the need to do it thoroughly;
He fancied none could ever tell whether he did it very well
Or slighted it, yet, truth to say, on him depended much that
day.

He was to nail a wooden crate. No chance in that for
splendor great;
No chance to prove his gift of skill, a thankless post was
his to fill;
Well nailed or not, 'twould be the same, the world would
never know his name;

And yet that wooden crate was filled with what had taken months to build.

He did not see or understand just what was passing 'neath his hand—

That as that wooden crate was nailed, a plan succeeded or it failed;

That miles away men stood in wait depending on that simple crate,

For not a wheel could turn or drive until it safely did arrive.

He drove his nails, and let it go, thinking that none would ever know

Whose hand had held the hammer there, or knowing it, would ever care,

Yet in a few brief days there came the news that burned his cheeks with shame—

“Broken in transit and we stay facing another month's delay.”

Vain is the skill of workmen great; unless the boy who makes the crate

Shall give his best to driving nails, the work of all the others fails.

There is no unimportant task; Whatever duty life may ask,
On it depends the greater plan—There is no unimportant man!

The whole subject of crating is covered in a number of publications. They include “Army and Navy Specifications for Packaging and Packing for Overseas Shipment, Nav. Spec. 39-P-162, Army Spec. 100-14a;” “Navy Shipment Marking Handbook,” “Navy Handbook on Packing and Material Handling—Airborne Cargo,” and “Preservation Methods for Storing and Shipping Combustible Engines.” From time to time various bureaus of the Navy publish Technical Notes, Technical Orders, and Circular Letters giving information on specific shipping problems. You will need to study these, too.

In packing a crate, always take special care that parts are securely fastened so that they will not come loose in transit. Make fastenings at strong points and so that racking of the crate will not bring excessive stresses on the parts.

Hulls, floats, and fuselages must rest firmly and securely in a cradle or on supports conforming to their contour within the case. Use padding, felt or other material on the cradle and supports to prevent injury to those parts. And the supports should be placed under strength members or bulkheads.

The Commanding Officer or Inspector of Naval Aircraft at the point of shipment will decide whether airplane fuselages are to be shipped with or without the engine installed. They have to consider the size and type of the construction, the weight of the engine, method of shipping, and other things. Sometimes the Commanding Officer or inspector at the destination point knows of particular circumstances that will affect the method of shipment. In that case, he gets the word to those at the place of shipping.

Always wire or in some other way secure in place the attaching parts of wings and other surfaces (hinge pins, bolts, clevis pins, etc.). Surfaces should fit the crates snugly and wings should rest on their leading edges.

HOW TO SHIP IT

All exposed metal parts including cables, wires, bolts, pins, etc., should be carefully coated with a suitable rust preventive compound. It's best to ship storage batteries dry. Parachutes always go in moisture-proof containers.

You usually ship two-bladed propellers assembled. Three bladed props that have been tracked and balanced may be shipped either assembled or disassembled. Your choice in this depends on shipping costs and the facilities for assembly at the destination point. If you disassemble a propeller, make a stripe of paint across the hub joint, clamp ring, and blade root **BEFORE** disassembly. Number the blades and corresponding hub branches with paint to make the reassembly easier without balancing. Protect the leading and trailing edges of the blades and be sure that they are not rigidly supported at the tips.

You'll find that special care has to be taken in packing balloons or non-rigid airship envelopes. The fabric must be cool and dry and it's best to fold it out of the sun and preferably in a temperature above 10°F. Detachable parts on the bag should be removed and packed separately, and cable should be coiled and wrapped in burlap to protect the fabric.

Wrap and lace the bag in a moisture-proof fabric container and then put it in a strong, tight, box. Be sure the interior of the box is smooth and lined with moisture-proof paper. Nothing but the bag is packed in the box.



Figure 29.—Some jobs require special care.

Store the box if possible in a dry spot—at least under cover. You can help preserve the bag, too, by printing or painting these instructions on the outside of the box so it will be given proper care while being shipped.

Before you ship an engine installed in a fuselage, you have to remove it, prepare it for shipment, and then re-install it. All accessories required by current BuAer instructions to go with the engine are to be shipped complete with it.

You'll have to stencil on the outside of the crate the Bureau number and the manufacturing number, as well as the name and type of engine in the crate. Stencil instructions for handling and opening the crate on the outside, too, with caution arrows showing the top of the crate.

An invoice of all material in the crate is secured to the upper right-hand corner of the end of the crate which is to be opened. The invoice sheets go in a weather-proof envelope—and make doubly sure they're attached so there won't be any loss. Another thing—check off the materials against the invoice as they go into the crate and make notes of any shortages. The engine log book will be forwarded by mail to the station or unit to which the engine is going.

When you're racking airplanes in box cars for shipment, treat them just as though they were crated.

When airplanes that have been operated are shipped by rail or water, the procedure is just the same as if they were being prepared for storage before crating or racking them. That goes for airplanes being shipped for overhaul as well as for those which are going to be placed in service when they reach their destination.

Mark all sub-assemblies of airplanes with linen or metal tags, listing the removable parts so that those receiving them will have complete information for checking the shipment.

UNCRATING

Before you start uncrating, make an inspection to see if crates have been damaged in any way. If they are, **DON'T OPEN THEM** until you've made a report of the damage to the proper authority and to the transportation company, if the damage is serious enough to make a claim against the carrier.

Always use care when opening and disassembling crates. Follow the instructions stenciled on the outside. Remember—many of those parts are extremely sensitive and although the crates themselves may be rugged enough to take some harsh crowbar handling, their contents may not be. Crates, when disassembled, should be **STORED**. You'll be using them again.

Check each part against the invoice, and be sure they're thoroughly inspected. If parts are missing, damaged, or defective, make a report to the proper authori-

ties without delay. They will take steps necessary to place the responsibility where it belongs.

Much the same procedure should be followed for uncrating engines as is followed for crates containing parts. Don't remove the engine from its supporting skid until it can be placed on an overhaul stand or is ready for installation in the aircraft. **DON'T LET AN ENGINE REST ON ANYTHING EXCEPT A PROPER ENGINE BED.**

PACKING AND PACKAGING OVERSEAS

When you land on an advanced base you'll probably be faced with all kinds of problems in packing, crating,



Figure 30.—Inspect all packages!

preserving and shipping supplies, with none of the special equipment and facilities that you would have at a larger base or supply depot.

More than once you'll find your unit moving out from an advanced base or foreign station—and moving out in a hurry. There'll be packing and crating to do. And you may not have any of the labor-saving devices such as strapping machines, band saws, joiners, etc. All that you may have read in the books or learned through experience on the mainland may not be worth a misfired cartridge. You'll be pretty much on your own. And

that's just one more time when the Aviation Storekeeper has a chance to show what he's made of and get the job done.

Two main things you need to remember and know about are rigidity of containers and the preservation of material before packaging. Either or both may mean the success or failure of a mission.

RIGIDITY

You won't have the same problem of unloading at advanced bases that you have at continental stations. At home, supplies are usually loaded at docks, piers, and warehouses where cranes, fork trucks, pallet boards, and other material-handling gear is available. When it comes around to unloading those supplies at the advanced base, you may have to do it under enemy attack and under conditions where there are virtually none of those labor-saving helps.

That's when speed comes first—and you can't handle a lot of supplies speedily if you're going to treat them as carefully as you would a new-born babe. They're going to get **ROUGH HANDLING**. And they can't stand that unless they've been packed in rigidly constructed containers.

First, consider the nature and weight of the material being packed. You can find weight loads in the publications mentioned on pages 62 and 63 of Navy Specification 39-P-16a. In every case, after you've selected the best container for a load, you must **REINFORCE IT** with strapping to provide the needed rigidity. Strapping ought to be about one-fifth of the container length from each end. Extra strapping gives rigidity, but the use of too many nails tends to weaken and split the lumber.

Never try to judge a container's rigidity by the way it looks. A container can be as deceptive in appearance as a woman who has poured herself into one of those rubberized foundation garments.

If you're using corrugated or fiberboard boxes, look

first at the tables on page 143 of Specification 39-P-16a. Fiberboard containers can be used only for limited loads and for certain types of materials. It's pretty hard to give them extra reinforcing, and even when you are successful in getting the reinforcing in place, it may have little or no value. Sometimes you can reinforce fiberboard containers to keep the contents from spilling when dampness loosens lids or bottoms.

When you're packaging material of a solid nature and of standard size and shape, fiber containers come in handy. Material like that should completely fill the inside of the container and it should not be subjected to shock or rough handling. Don't pack highly corrosive material in fiber containers unless the container is highly resistant to water—and even then only if all cracks and joints can be made absolutely watertight.

Open crates especially need extra rigidity. They should be used only for sturdy material such as heavy shop machinery, solid assemblies (except aviation), and other bulky material of solid but non-puncturable construction. Use open crates only for shipments within the continent—never for overseas shipments. Structural spares covered with sheet aluminum, fabric, or of plywood construction should never be placed in open crates for overseas water-borne shipment. Closed crates are best for crating material that is large and easily punctured.

There are many variations to the approved types of nailed wooden boxes for the packing of special items such as delicate machinery, extremely delicate instruments, acids in carboys, and liquids in large bottles. Large but delicate machinery should be kept in an upright position in transit and it can be packed in boxes of varying shapes. In any variable construction designed to keep the container in an upright position, an arrow pointing toward the top with the words "THIS SIDE UP" must be stenciled on all four sides.

Large carboys of acid and large bottles of liquid should be kept in an upright position at ALL TIMES.

Spilled liquids, especially acids, can cause irreparable damage to other material. At no time should a carboy be packed with the neck protruding and covered by a small box protector. All that haste and rough handling might very easily result in both the protector and neck getting knocked off.

Once again, your own ingenuity will be called upon in packing extremely delicate instruments for long trips where shock and rough handling may cause damage. One of the best methods is to suspend the instrument from six or eight lengths of shock absorber cord attached to the **INSIDE** corners or sides of a larger container usually of fiberboard construction. Then pack the larger container inside a rigid, nailed wood box large enough so that four to six inches of space surround the suspension container. This space should be filled with excelsior or some other good shock absorbing material.

You can increase the rigidity of a fiberboard container by bracing it with specially folded fiberboard interlocking cells and partitions. These are used for some items which do not completely fill the container, but need protection against shock. The cells and partitions are better than ordinary excelsior or stuffing and are equally effective for absorbing shock.

PRESERVING

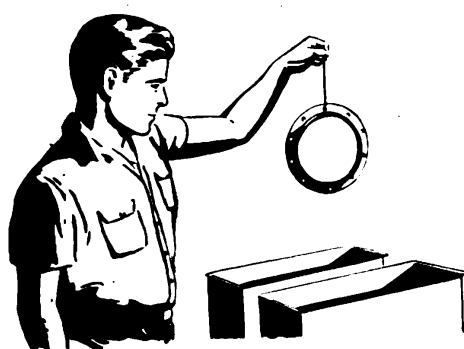
You're going to have to stick mighty close to the prescribed method for applying preservatives to metal parts for overseas shipment.

Almost every metal in use today is subject to some kind of corrosion. Salt air and alkali dust are the two fastest-working corrosive bodies, and you find them working overtime around small island areas or other places close to the sea coast. These two agents, either together or alone, can create galvanic action so rapidly that a piece of unprotected metal **MAY BE RUINED IN LESS THAN 24 HOURS**. Responsibility for proper preservation rests right on you and the Supply Department.

It isn't enough to protect the material against corrosion. You've got to **PROTECT THE PROTECTION** as well! If an item has been given a preserving treatment without any further protection, scuffing or chafing may expose the bare metal, and corrosion can begin its destructive work. Remember, one small pit can ruin a highly machined part.

ALL WRAPPED UP

You can waste a lot of time, labor, and material by wrapping an item with a waterproof material without making sure that water cannot penetrate through the



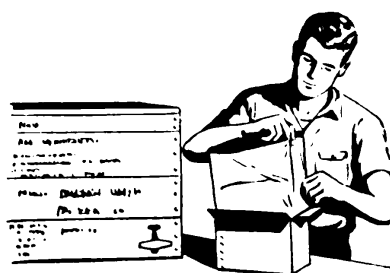
DIP IN PRESERVATIVE



WRAP CAREFULLY



MARK INSIDE



MARK OUTSIDE

Figure 31.—Preserving and wrapping calls for painstaking work.

wrapping folds. To make sure your wrapping is effective, wrap the item and seal it, over-wrap and seal a second time, and wrap again, changing the direction of the wrapping each time. When wrapping protrusions, such

as horns, or hinges on ailerons, be sure that water-collecting funnels aren't formed with the paper.

A further protection against corrosion of metal can be taken by lining the container with waterproof paper. The paper should be cut in lengths and sizes to permit lining down the end or side, across the bottom and up the other end or side, with enough paper left over to fold from end to end, or side to side, across the top. Since this isn't enough protection to prevent seepage if the item is immersed or is in heavy showers, you'll have to seal all inside joints with asphaltum or some other approved water-resistant cement. In humid, tropical climates, "sweating" takes place within water-proofed paper containers. To combat it and to absorb the moisture, a generous use of small bags of silica-gel is required.

You need to know all about wrapping, stuffing, wadding, and cushioning materials, too. Some items need very special care and the right material has to be used. Excelsior and shredded paper are most commonly used for stuffing and should be used generously when packing material that can be damaged by shock.

Internal lining fillers, made by folding corrugated fiberboard may be classed as stuffing, shock absorbers, or fillers. These add rigidity to a package. Because of the higher cost of water-proofing materials, they shouldn't be used in wrapping non-corroding items. Ordinary brown kraft wrapping paper can be used instead.

ADDRESSES AND INVOICES ARE "MUSTS"

Here's another way to waste time and energy—and possibly throw a whole combat activity off its schedule. Careful packing is worthless unless you're just as careful in addressing those packages and crates. Address them legibly and in a way that they won't become illegible.

If you don't have stencils, PRINT the addresses by hand with a good, durable, waterproof, non-smearing

paint. Non-smearing paint also should be used with stencils. Markings applied with a poor grade of paint can't take the salt air, rain, and hot sun any better than the sensitive skin of the fairest blonde.

When those crates get 'way out front to a base, there may not be any shelter for them. If the address and other necessary data wears off or can't be read, the containers have to be opened, then repacked, and re-marked.

You can follow all the instructions for packing and addressing and still drop the ball if you don't properly invoice and tag the material. There are only two rules applicable to this business of tagging and invoicing, but they are TWO RULES. Every item must be invoiced. Every item must be tagged.

Never close a container until you're POSITIVE an invoice has been included with the material. Never wrap and place an item in a container until it has been tagged. Sometimes, several small items may be wrapped in one compact package. In that case, a separate tag should be secured to the outside of the package showing only the item numbers of the invoice included. That speeds identification and also makes it unnecessary to open the packages.

Two copies of invoices must go along with all shipments. They are enclosed in WATERPROOF envelopes or are carefully wrapped in waterproof paper. Place one copy inside the container, between the waterproof lining and the lid near one end and corner so that by removing one board from the lid you would have access to the invoice. The other copy should be placed in the recess of the cleated end of nailed wood boxes and covered with a protective board or piece of sheet metal slightly larger than the envelope, making sure that nails don't penetrate the inner waterproof lining. Remember, a watersoaked invoice is useless!

Positions of all invoices should be indicated by an arrow and the word "Invoice." When you're putting a copy of an invoice in or on an open crate, secure it inside and up in one corner. One copy should also be

secured in some outside recess with arrows and the lettering "Invoice," indicating the positions of both copies. Secure those outside copies so they won't be scuffed or brushed off.

When you master the business of receiving aeronautical materials, storing them, and packing them, you're well along the road to successful aviation store-keeping. But as Poet Guest said—there is no unimportant task or unimportant man, and unless the boy or man who makes the crate gives his best to driving nails, the work of all the others fails.



CHAPTER 7

INVENTORY—ESPARES

HELP ASO HELP YOU

Once a year, you'll be taking an inventory of all aeronautical materials and equipment on hand. This is done to bring records and stock into agreement by actual count. The operation is good business, essential to any supply activity. When the items used in Naval Aviation are scarce they must be shifted from place to place—from wherever there's any excess to spots which are short.

Sensible transfers can't be made unless ASO has an **ACCURATE** record of what's on hand and where. It is essential that stock records and the actual inventory of materials on hand be **IN AGREEMENT**.

When Naval Aviation began to boom at the start of World War II and factories were being urged to produce and produce and then produce more aircraft and parts, it became evident that there would be an increasing shortage of materials to carry out the production schedules. In order to anticipate the shortages, and to be able

to meet them, it was necessary that a CLOSE CHECK be kept on the materials which were scarce.

So BuAer and ASO developed a daily "Status Report of Essential Operating Spare Parts and Assemblies," and wasted no time in abbreviating that name to the ESPARES LIST. These items already were in a critically short status and the need for them was so intense that distributing points and major supply points were called upon to make daily reports by teletype to ASO on the quantities they had on hand.

In order to avoid adding more items to the list of critically short items, a second list of "Semi-Critical Parts" was developed, on which monthly reports were requested. That was so consumption could be slowed up, in some instances, and so that procurement could be started whenever possible to meet the expected demands. It also served to keep the semi-critical materials from moving into the Espares List.

STOCK BALANCE REPORTING PROCEDURES have been developed by ASO for reporting these restricted and highly critical spare parts. The report is made up from information sent from annexes and selected supply depots. At some of these locations, you will report changed balances each day by TWX and at some you'll make a weekly report by air mail.

YOUR REPORTING JOB

You'll make monthly stock balance reports of semi-critical items which are important because of their use for outfitting and commissioning ships and advanced bases, and for operational and repair programs.

The critical items (Espares) are listed together with the semi-critical items of the same general type in Section I of the monthly report. That makes reference and reporting easier. In listing the Espares items, you can distinguish them from the semi-critical ones by an asterisk (*). As already mentioned, you'll report those with an asterisk on both a daily (or weekly) and

monthly basis. Use only the monthly basis for the items without the asterisk.

Espares items are included in the monthly report mainly so corrections can be made at ASO. Movement of items during the month may be inadvertently omitted on the daily or weekly reports. The omissions will be caught on the monthly report.



Figure 32.—Some reports are teletyped.

When ASO receives all the reports, separate consolidated reports of Espares and semi-critical items are made up and sent to cognizant activities and authorities as soon as possible.

The Espares and semi-critical items reported on the inventory are divided into six sections. Each section is broken down by class and manufacturer, or type of material. The Espares items consist of materials which are used on COMBAT type aircraft, even though they may also be used on other types.

You'll notice a CONTROL CODE column on the report which shows the agency or command controlling the distribution of a particular item. "A" indicates control by ASO. "B" by BuAer. "F" by the Fleet, including ComAirLant, ComAirPac, and CNAOpTra. "L" by ComAirLant only, and "P" by ComAirPac only. Of

course, those items designated by "P" or "L" are controlled by the Fleet Commander only within the area of that command.

YOUR INVENTORY FORM

SECTION I includes parts and equipment for operation of combat type airplanes—material such as airframe structural parts, engine accessories, structural accessories, propellers, radio, radar and other operational equipment. All Section B allowance list items are in this section.

SECTION II covers parts and equipment for operation of transport and utility airplanes. This section, you'll find, follows the same general subdivisions as for combat type airplanes.

SECTION III covers parts and equipment for operation of intermediate and advanced trainers.

SECTION IV includes parts for operation and overhaul of primary training airplanes.

SECTION V shows engine spare parts.

SECTION VI is a catch-all for miscellaneous spare parts, materials and equipment.

You will show two stock status figures for each item on the list.

The first figure will show quantities on hand and ready for issue including quantities reserved by direction of a Fleet Commander, BuAer, by ASO for outfitting or commissioning of squadrons or advance bases, or held because of any other authorized reservation.

The second figure shows quantities on hand awaiting or undergoing repair including that which normally would be processed by the A&R Shop and made ready for issue. Don't include in this figure items which normally would not be repaired or those which are awaiting survey.

Where the same kind of stores are carried in several different places, you'll have to get all the figures, then merge them into one quantity. Be sure that material

in the report is identified in the same way as it is on the stock record cards.

A physical inventory of all stock in the Espares List should be taken quarterly, and at that time you will reconcile the quantities on the stock cards with actual quantities disclosed by the inventory.

When the monthly reports have been filled out with pen, pencil, or typewriter, they are forwarded BY AIR MAIL to ASO. Use regular mail only when there will be no loss of time. If you're making daily reports on Espares, you'll use teletype. If they're weekly reports, you'll airmail them to ASO on Friday of each week.

SPECIAL ATTENTION FOR ENGINES

Standard Engine Inventory Lists issued by BuAer are used when an aircraft with engine installed is being transferred between Supply Offices, between operating units, or between Supply Offices and operating units. The transferring activity makes the inventory of the craft and engines and if any shortages appear, makes the necessary withdrawals from stores or operating spares to remedy them before the transfer takes place.

When standard lists are not available you use a Report of Material Shipped to make the inventory. In such an instance, it's best to inventory everything except hidden or inaccessible items. Attach a typewritten note, saying that the inventory was taken from the RMS. If an aircraft is received with all the papers missing, use the papers from another craft of the same type. And be sure to report that the craft was received without the original papers.

You'll be using a Report of Inventory form to show shortages and excess materials at the time of the inventory. This supplementary form also is used to get the receiving signature of the ferry pilot and for the signature of the receiving unit.

When you're at a receiving activity, make the inventory of the INCOMING CRAFT AND ENGINE with the

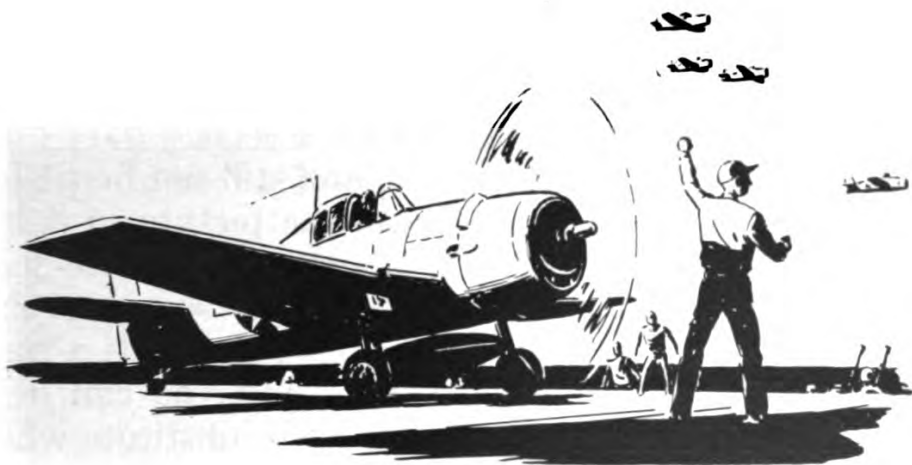
ferry pilot. Complete the report by making appropriate entries on all copies of the inventory form, entering "No Shortages" if there are none, "Items Missing on Inventory" if there are missing items, and listing them.

You'll get a lot of help from time to time from the INVENTORY TEAMS which the Aviation Supply Officer has established. They visit supply points and dependent activities, check records, make spot inventories on items included in the Espares and semi-critical lists. After these close-at-hand studies, the teams are well equipped to make recommendations to the Aviation Supply Officer for reallocations of materials.

Although the teams are primarily concerned with materials, you'll find them of real help in an educational way. They can give you many tips that will make your work more efficient. They'll be looking at stock records, checking the extent of excessive, obsolete, and inactive stocks. They examine storerooms, shop stores, operation and overhaul areas. They'll want to see your survey storerooms and scrap stock piles and find out what quantities of these materials you have on hand so they can report their findings and make recommendations to the Aviation Supply Officer.

They'll want to see how you're identifying Espares and semi-critical items on your stock records, your method of record keeping, how often inventories are taken, and why, perhaps, there are delays in posting. When they reach your activity they probably will make a physical inventory of selected items in the Supply Department and in shop stores, in the storerooms not directly under the Supply Department, and in overhaul and operational areas.

All of this is done to keep a close check on aviation materials—to know where they are and when they can be sent to another spot. When you think of all the items, and when you remember that your whole task is to get the supplies where they're needed, you can see that inventories have to be ACCURATE and that for many items, it's necessary to have a day-to-day check.



CHAPTER 8

STOREKEEPING—ASHORE AND AFLOAT

WHAT'S ITS NAME?

Even though all the phases of Aviation Storekeeping already mentioned are important and essential to the job you're doing, you still can't do the work expected of you and you can't keep those airplanes and other aircraft in the air unless you have a THOROUGH knowledge of the parts that go into them.

When you get into a storeroom, study those parts whenever you can. Introduce yourself—they won't mind! Get acquainted with them. Know them by sight and by name. You can pick up plenty of helpful information and knowledge by browsing around an A&R Shop or any other spot where they're actually installing new parts to make airplanes ready for flight.

Actual contact with the parts will help. But until you're up in Aviation Storekeeping, you won't have much chance for that kind of acquaintance. When you get to the point where you're fit for actual field duty, you're supposed to know the parts pretty well.

Not only do you have to know the parts, but you have to know which ones are INTERCHANGEABLE and with

what others. That, essentially, has become one of the major needs in aviation storekeeping today. So often a desired part just isn't where it's needed, and another similar part has to be substituted. A second part may LOOK like the one that is wanted, and still not be fit for use. That's where you come into the picture in a big way. It's up to you to KNOW whether or not the substitution will work. When an AMM or someone else comes along wanting a part, he knows he needs a part for a specific spot on the aircraft. And you can help him by having the knowledge needed to substitute when substitution is necessary.

There isn't any way to over-impress you with the importance of a thorough knowledge of the interchangeability of the various parts and accessories, the instruments, and where to get the information.

Squadrons and A&R Shops, or any other working unit seldom have copies of the interchangeability lists furnished by ASO. Those outfits are concerned mostly with maintenance and erection manuals, and with the actual flying of aircraft. That's why it's up to you as an Aviation Storekeeper to have all that information at hand, ready to determine, yourself, what items are interchangeable. That knowledge may be the difference between putting combat airplanes in the air or having them remain on the ground and become a target for enemy attacks.

KEEPING UP WITH INTERCHANGE

With a sharp understanding of interchangeability, you can make your Supply Department an outstanding unit. Pilots and Aircrewmen want to work with such a unit since that's the kind that keep them in the air. If you're to be a part of an outstanding unit, you have to STUDY the lists.

Because of constant improvements to aircraft, Bureau changes, and circumstances that require revisions, many items have a greater degree of interchangeability than

may appear on any list. Take the initiative! Keep your own discoveries filed with your regular lists, and pass them on to ASO. Make notes, and keep them in a ready file or ring binder tabbed by various categories and broken down to items such as "Planes, Wings, Tail

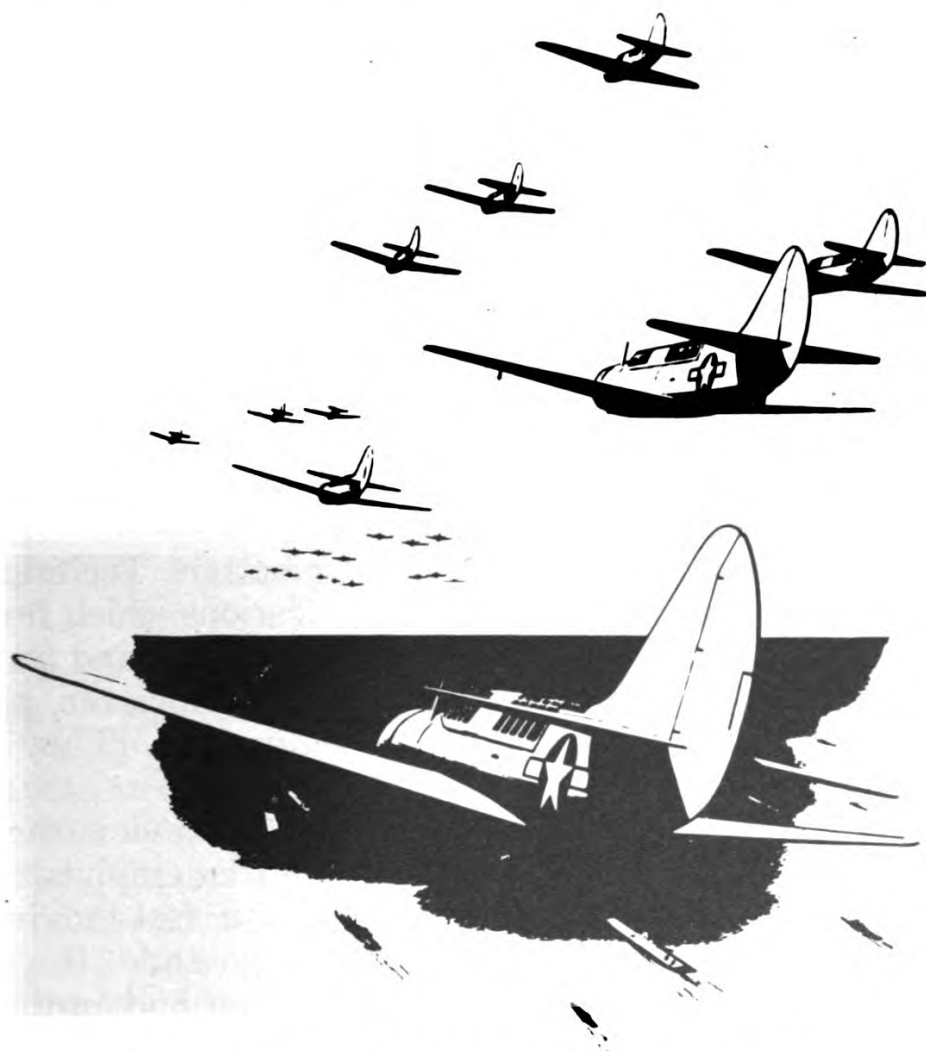


Figure 33.—Keep in step with aviation progress!

Surfaces, Rudders, Landing Gear, etc.," or "Engines, Accessories, Generators, Magnetos, Carburetors, etc."

Always make certain that the new information is **RIGHT** before you record any of it. In the field you'll find one of the best authorities to be the squadron head. An Aviation Machinist's Mate may become over-en-

thusiastic and give you an idea which isn't entirely correct—an idea which, if you accept it, may cause serious and sometimes irreparable damage to an airplane.

Protect the whole flying force—the pilots and Air-crewmen, your Supply Department, and the mechanics—by always being accurate. That's your job! If you're not sure of yourself, be the first to recognize it and admit it. It's far better to admit a lack of knowledge than to bring disaster through false or incorrect information.

While you can't learn the names of all the items of an airplane or other aircraft, you can learn the names of some of the more easily recognized parts or equipment which are pretty much standard. Since you'll be living with those names, the sooner you're familiar with them, the better.

KEEP UP WITH THE PARADE

From time to time you get Circular Letters, Technical Notes, memoranda, and similar publications which help keep you abreast of aviation developments and procedure within Aviation Supply. These, however, are prepared and mailed during no set periods. They're sent when the occasion arises.

When they do come, make it a point to review them and bring yourself up to date. It can't be emphasized too often that you're in the midst of a fast-moving, ever-changing Naval activity. If you go stale, if you don't keep up with the parade, you'd better find another billet. The successful Aviation Storekeeper has to be as progressive as aviation itself. And that's really up-and-coming!

This is a good time to remind you that ways of doing things in Aviation Supply changed plenty in the last war and are bound to change some more.

Procedures differ—and change—from ship to ship and from station to station. They have to, in order to meet local requirements. This is a BIG NAVY. An aircraft

carrier has a lot of supply problems that don't apply to a small training field. And vice versa.

So you'll have to adapt yourself QUICKLY and COMPLETELY to new conditions, when you find them, and to new ways of doing things.

One big help in keeping up with the parade is to KEEP UP WITH THE PUBLICATIONS. These include the regular manuals, like the ASO Catalog, with the latest changes and additions.

EVERYTHING BUT TALK

The ASO publishes its own catalog of standard parts. it's a honey! It does everything but talk. Sears Roebuck can't do better. You'll be using this book constantly.

It includes a cross index of Navy stock numbers and Army Air Forces stock numbers. Many of these parts, you'll find, are interchangeable. You can't learn them all, but it's a good idea to become familiar with as many as you can.

The ASO Catalog has been established to furnish you and other aviation activities with current information on available stock. It standardizes nomenclature of parts and provides uniform identifying numbers for stock records and for storage purposes.

The usual catalog arrangement for material in each of the classes from 80-94 (except 80, 84, and 90) is a general section in order by stock number including principally Army-Navy Standard, Air Corps or Army Air Forces, or NAF Standard parts, but including some manufacturers' items not covered by special manufacturers' supplements. There are also sections for special supplements for each of the principal manufacturers of airframes, engines, and accessories. The supplements are arranged in order by manufacturers' part number for each subdivision.

As an example, ordinarily spark plugs for gasoline engines, are carried in Class 17, but since the spark plugs you'll be dealing with are almost entirely for aero-

nautical use, they are found in Class 86, "Aircraft Engine Accessories." The arrangement in the catalog is by engines on which the plugs can be used. This makes a list which can be used for interchangeability. For instance, when an AMM wants to exchange some B.G. 321-S plugs from an R-1535-96 engine, you refer to the catalog and find that four other varieties of plugs can be given in replacement.

The ASO Catalog is full of pictures and drawings, which help you in identifying material. Take a look at

CATALOG OF AERONAUTICAL MATERIALS, SPARE PARTS, EQUIPMENT **CLASS 47**

ALUMINUM COILED STRIPS

Aluminum strip is used in making patches, repairs and in covering seams.

HOW TO ORDER: Order in pounds. State stock number, metal and alloy, thickness, length and width in inches, specification, condition and number of pounds.

EXAMPLE: R47-A-613-4000—Aluminum copper magnesium, coiled strip, heat treated, Spec. QQ-A-355-24SO, condition A, .016" x 1 3/4", 100 pounds.

Furnished in coils with an average weight of 25 to 50 lbs.

SPEC. QQ-A-355, 24 SO (Condition A)

ALUMINUM COPPER MAGNESIUM 1.5%

Item No.	Stock No.	Thickness, In.	Width In.	Lbs. per Lineal Ft.
880	R47-A-613-4000	.016	1 3/4	.0326
882	R47-A-613-4050	.032	3/8	.0168
884	R47-A-613-4055		1/2	.0192
886	R47-A-613-4060		5/8	.0216
888	R47-A-613-4065		3/4	.024
890	R47-A-613-4070		1 1/8	.0264
892	R47-A-613-4075		3/4	.0288
894	R47-A-613-4080		1 1/8	.0312
896	R47-A-613-4085		3/4	.0336
898	R47-A-613-4090		1 1/8	.0408
900	R47-A-613-4150	.040	3/8	.027

MANGANESE AL 24 SO ANNEALED

Item No.	Stock No.	Thickness, In.	Width & Length, In.	Lbs. per Sq. Ft.
902	R47-A-613-4155	.040	1/2	.024
904	R47-A-613-4160		3/8	.027
906	R47-A-613-4165		3/8	.030
908	R47-A-613-4170		1 1/8	.033
915	R47-A-613-4175		3/4	.036
917	R47-A-613-4180		1 1/8	.039
919	R47-A-613-4185		3/4	.042
922	R47-A-613-4190		1 1/8	.051
923	R47-A-613-4195	.051	1	.0612
926	R47-A-613-4200	.064	3/4	.0576

SPEC. QQ-A-359, TYPE 2

ALUMINUM COPPER MAGNESIUM

Item No.	Stock No.	Thickness, In.	Width In.	Lbs. per Lineal Ft.
932	R47-A-1413	.016	1 1/2	.0094
936	R47-A-4490		2	.0378

1.5% MANG. AL-3 HALF-HARD

Item No.	Stock No.	Thickness, In.	Width & Length, In.	Lbs. per Sq. Ft.
938	R47-A-1550	.056	6	.0407

Figure 34.—Sample page from ASO catalog.

one of the books. Thumb through it and you'll see how easy it is to use. To give you an idea of the catalog style, a page is shown in figure 34.

YEARLY REVISIONS

Each section of the catalog is revised and brought up to date every year and is distributed prior to the

date scheduled for replenishment of items in that section. Copies for requisitions are sent by express or air express to the major supply points. These are redistributed by the major supply points to dependent activities for use as requisitions. Reference copies for storehouses, shops, and for general use by aviation activities, are forwarded by parcel post direct to the activities REQUESTING THEM.

Since the ASO Catalog is in loose leaf form, it is easy to keep it up-to-date.

You can help speed up procurement, storage, and issue of aeronautical materials by adopting FOR ALL PURPOSES the nomenclature and stock numbers used in the ASO Catalog. That brings uniformity throughout the service. And the importance of standardized nomenclature and stock numbers is another point that can't be stressed too much.

When ASO Catalog sections reach your activity, be sure that stock record cards agree with catalog identifications such as stock numbers, nomenclature, and specifications. Sometimes, requisitions are received at ASO without proper identification, and this can result in duplicate ordering and storing. Such requisitions also require special handling and interpretation at ASO. This obviously slows things up when there isn't time.

ASO Catalog stock numbers preceded by the letter "R" are those considered to be of strictly aeronautical application. BuAer or ASO initiates procurement of the materials to which they apply specifically for aviation activities. DON'T use the distinguishing letter "R" in stock numbers that are assigned locally. It is RESTRICTED to stock numbers published by ASO.

Many of the standard stock items appearing in BuAer allowance lists are incorporated in ASO stock lists. They are included to indicate that activities at considerable distances from Navy Yards or Depots should maintain them. They are distinguished by use of the procurement symbol "X" preceding the stock class in Column 7, and the limitation symbol "O" in Column 8.

HELP THEM HELP YOU

You make your work as an Aviation Storekeeper a lot easier when you use the ASO Catalog. You make it easier still when you get OTHERS in the habit of using it, too.

In other words, you can teach that Metalsmith or Machinists' Mate who is always asking you for "that little gadget that goes on the end of the wha-cha-ma-call-it" to take a peek at the ASO Catalog to identify the parts he wants. It will save your time and his.

Some Aviation Storekeeper with a poetic turn of mind once expressed this thought in a poem. You'll undoubtedly appreciate its sentiments. Here it is.

THE LAMENT OF STOREKEEPER JOE

When A&R squeals for shock struts or wheels
And CASU is yelling for mo'
And HEDRON deplores the shortage of cores
Say a prayer for Storekeeper Joe.

When the Mechs on their knees rassle SB2C's
And H-hour is minutes to go,
The guy who delivers the parts for sky-flivvers
Is hard-working Storekeeper Joe.

He's expected to know all the parts that don't show
On a bomber or fighter or drone,
From the right spark plug size and the turnbuckle eyes
To the Bendix main wheel bearing cone.

It would help in the job of this bin-happy gob
If Mechs would just try to assist
With number or name and description of same
Instead of requesting like this:

"It's the gismo that fits on the gadget that fits
On the piece with the odd looking thing
Which strikes with a wham on a little round cam
And lands on that hick-a-ma-jing."

But alas, the poor Mech is 'way up to his neck
In work of priority high.
And often as not no one knows what we've got
In those stores that are piled to the sky.

Dry your eyes and relax; you'll now have the facts.

(Please excuse all this immodest noise)
We suggest that you look at the handsome new book—
The ASO Catalog, boys!

There are pictures and such, stock numbers and much
Other dope that will identify
The nuts, bolts and screws, and assemblies you use
To keep fighting planes in the sky.

Batteries and mags, and soft sleeping bags;
And tie rods and radio tubes,
Struts, wheels and brakes of various makes,
Paint, dopes, preservative lubes.

And often enough interchangeable stuff
Is shown just by application,
Presenting each hunk to show similar junk
Arranged in its proper relation.

When search without cease fails to locate a piece
(Even though we probably bought it),
Our storekeeper friend can say in the end:
“Oh, hell, brother, I haven’t got it.”

Except for Class 43, stock numbers assigned by ASO for materials in Classes 5 to 75 have been arranged to permit the maintenance of stock record cards for both the aeronautical items and the standard stock in a single file for each class, preserving the numerical and the alphabetical continuity of the file. The Navy supplement to the Federal Standard Stock Catalog was the framework into which the stock numbers for aeronautical items were fitted. For Class 43, however, this framework was not adequate to allow for expansion resulting from the inclusion of thousands of aeronautical items.

CLASSIFICATION INDEX

Wherever you are, you should have copies of the CLASSIFICATION INDEX OF NAVAL AERONAUTICAL MATERIALS at hand for ready reference. It’s published in loose-leaf form as part of the ASO Catalog, and changes and additions are furnished from time to time.

Classification Index of Naval Aeronautical Materials

VIEWERS
WIND CONES

V	TITLE CLASS	W	TITLE CLASS	W	TITLE CLASS
Viewers		Washers—continued		Weights	
Polaroid	B 93	Electric (<i>Special</i>)	C 17	Aircraft Engine	C 85
Training Device	B 33	Engine Hoisting Sling	C 89	Aircraft Engine Accessory	C 86
Vinylite		(<i>Special</i>)		Carburetor	C 86
Viscosimeters		Fire Extinguisher		Generator	C 86
Lubricating Oil	B 18	(<i>Special</i>)		Airplane	
Vises		Airplane Fixed	C 83	Balance	C 82
Bench	B 41	Portable	C 58	Counter Balance	C 82
Bottle	B 41	Flat	C 43	Elevator	C 82
Chain Pipe	B 41	Life Raft (<i>Special</i>)	C 83	Antenna	C 16
Chuck Pin	B 41	Lighter Than Air	C 92	Metric, Aerological	B 18
Combination	B 41	(<i>Special</i>)		Propeller Hub	C 87
Drill	B 41	Lock	C 43	Speed Reducer	C 82
Dual Action	B 41	Metal	C 43	Weld Assemblies	
Flanged	B 41	Plain	C 43	Airplane	C 82
Hand	B 41	Print, Photographic	B 18	Welders (<i>See also Cutting and Welding Units</i>)	
Hydraulic	B 41	Propeller Hub	C 87	Electric	B 17
Jeweler's	B 41	Radio (<i>Special</i>)	C 16	Welding and Cutting Units (<i>See Cutting and Welding Units</i>)	
Lantern Slide	C 18	Retaining	C 43	Welding Torches (<i>See Torches</i>)	
Machine Tool	B 40	Spray Gun	C 41	Well Assemblies	
Machinist's	B 41	Spring Lock	C 43	Airplane	C 82
Pattern Maker's	B 41	Stop	C 43	Oil Tank	C 82
Plain	B 41	Training Device	C 93	Wheel	C 82
Receiver	C 1	Felt	C 93	Lighter Than Air	
Automatic Gun	C 82	Fiber	C 93		
Visors		Insulating	C 93		
Airplane	C 82	Rotary	C 93		
Visual Quizzes		Spring	C 93		
Automatic Slide Film	B 93	Thrust	C 93		
Training Device	B 93				

Figure 35.—Classification Index shows nomenclature.

This is your best source for discovering the classification of parts. Of course, the ASO Catalog carries other indexes, too, but the Classification Index shows the nomenclature of the part and how its expenditure is classified as well as the classification number.

The classification system for aeronautical materials follows closely that established in the Federal Standard Stock Catalog which has been used in Naval Supply activities for many years. You'll find the relative importance of groups of classified items, however, quite different for aeronautical items than for standard stores. For example, Class 37 in the Federal Standard Stock Catalog is titled, "Athletic Equipment, Recreational Apparatus, Sporting Goods and Special Wearing Apparel." In the Standard Stock Catalog the special wearing apparel title includes relatively few items, but it's the major part of the section for this class in the ASO Catalog, since flight clothing is classified as special wearing apparel.

And again—in the Federal Standard Stock Catalog—Classes 80-94 appear only as class titles since they generally cover material exclusively aeronautical in character and usually not similar to standard stock items. But in the ASO Catalog they make up the major portions of the book!

Classification is at best a "matter of opinion officially established, rather than a matter of general agreement." On the surface, some changes in classification may seem very desirable, but you must remember that a change would require extensive changes in records and shifting of stock and probably would result in a lot of confusion throughout the entire system. You can be sure that ASO gives careful consideration to the initial classification. Subsequent changes are made only when it appears that the permanent effect to be gained will offset the temporary disadvantage to storekeepers, accountants and all others who have to deal with the items.

The index will show many items listed under the several names by which they might be identified. For

MANUFACTURER'S SPARK PLUG RECOMMENDATIONS

MANUFACTURER	ENGINE MODEL	PLUG RECOMMENDED					
		BG		CHAMPION		BENDIX-SCINTILLA	
		SH'ED	UNSH'ED	SH'ED	UNSH'ED	SH'ED	UNSH'ED
Pratt and Whitney Aircraft	Wasp B. C1. C1G. SCL SD1. S1D1. T1D1.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Wasp S2D1. SE. S1E. S1H1. S2H1. S3H1. S1H1. T1H1. T3H1.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Hornet B1. B1G. C. S1B1. S2B1. S1C. S2C. T3B1. T1C.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Hornet SD. SD1. S1D1. S3D1. S1E-G. S2E-G. S3E-G. S5E. S9E. S10E. S11E. T1D1. T2D1. T2E.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Wasp Jr. A. S2A. SB. T3A. TB. T1B.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Twin Wasp SA-G. S1A-G.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Twin Wasp SB-3-G. S1C-G.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Twin Wasp Jr. S1A-G. S5A-G. R-1535.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	Twin Wasp Jr. SB4-G. S3A1-G. S1A5-G.	4B2-S or 4B1-S	4B2 or 4B1	M-3-1S	M-3-1	9BS-2	437J
	R-790 (J5, J5A, J5B).	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-600 Challenger.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-510 Whirlwind A and D.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-540 Whirlwind E and E1	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-760 Whirlwind A, D, E, E1.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
Wright Aeronautical Corp.	R-760 Whirlwind E2.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-760 Whirlwind ET.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-975 Whirlwind A, B, C, D, E1, E2.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-975 Whirlwind E1, E2, E3, C.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-1750 Whirlwind 7R-1670 Double Row Whirlwind.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-1750 Cyclone A, B, C, CE, D.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-1750 Cyclone E.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-1820 Cyclone E, EM, F11, 21, 31, 32, 33, 41, 42, 43.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-1820 Cyclone E1, E3, F1, 2, 3, 5, 52, 53, 54, 55, 56.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-1820 Cyclone F52, 53, 54, 55, 56, 62.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	R-1820 Cyclone G1, 2, 3.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J
	Wright Gypsy.	4B1-S or 4B2-S	4B1 or 4B2	M-3-1S	M-3-1	9BS-2	437J

Figure 36.—Manufacturers' catalogs are valuable.

instance, there may be, "Cover, Protective—Life Raft Class 83," and elsewhere, "Sail, Life Raft (see cover, Protective—Life Raft) Class 83." Some material can properly be placed in various classes when it's closely associated with material in other classes. You'll find it in the section with the class of material with which it's commonly associated, and you'll find it, too, in the class in which it properly appears in its own right. The first aid kit used with life rafts, for example, is shown with life rafts in Class 83, but you'll find it, too, in Class 57, where it properly appears as an item of hospital equipment.

MANUFACTURERS' PART NUMBERS

An airplane manufacturer purchases many parts for his product from airplane accessories companies. These include airframe parts, such as wheels, brakes, shock struts, hydraulic equipment, master cylinders, and so on.

In many instances, the airplane manufacturer has assigned his own part numbers to such items and they appear as such on his drawings, indices, spare parts lists or rough stock material lists. In cases where the manufacturer has given the vendor's name and part number, the information is usually only for the complete assembly of the part, such as the wheel, brake, etc., and rarely includes a complete breakdown of the vendor's various details which make up the assembly.

Very often you'll need only part of a brake, shock strut, etc., but since the manufacturer lists only the assembly number, it is difficult to identify properly the required detail part and often a complete assembly is requisitioned. To eliminate that, each assembly has been broken down to give the title and part number of every detail.

MANUFACTURERS' CATALOGS

You'll need to have on hand manufacturers' catalogs for all the airplanes, engines, propellers, and accessories

with which your outfit is concerned. BuAer has set up standard specifications for all such publications and requires that manufacturers prepare and furnish them for their airplanes, engines, etc. The requirement is set forth in the contract for the airplanes, so there's no question about your getting these manufacturers' aids.

One Navy airplane has 27 separate assemblies which go to make up a complete wing including in a single unit both the left and right wings. One part of this overall assembly is the wing panel. The wing panel, in turn, is broken down into subassemblies, one of which is the wing beam assembly. This further is broken down into parts and pieces. Some items are given "left" and "right" designations, "L/R" designation meaning that there is one part for the left side and one for the right side.

Just to give you an idea of how many parts can be listed in the make-up of one plane—31 pages are devoted to the wing group alone! And this is only ONE group!

You find a listing of the required number of manufacturers' numbered parts for each particular size and modification of an engine. For instance, for the Wright R-2600-13 engine, you'll see that 56 nuts, Wright Part No. 33-D-16, are required. But that same part is used on quite a few other types and their modifications, so this particular parts listing becomes, in a sense, an interchangeability list.

You find that many parts also are given NAF and AN parts numbers. That means they have become standardized for use not only on Wright engines, but also in other aeronautical equipment.

Sometimes a manufacturer will be using a particular part which is identical to that being used by another manufacturer. Each has his own designated part number. But why should the Navy stock these parts which are identical in two different bins, carry two different stock cards, and have to deal with two different manufacturers to get them? That's when the Navy steps in

and sets up a "standard" part and requires the manufacturers to comply with it by using standardized materials. The specifications and drawings are established by the Navy and the parts which formerly carried different manufacturers' numbers now carry an NAF designation. The Army does the same thing, but its specifications carry an AC or AAF designator.

THE PHOTOGRAPHIC CATALOG

There's still another special kind of catalog that is helpful in supply matters. That's a PHOTOGRAPHIC catalog which has been produced at NAS, San Diego. Such catalogs are used in making overhauls of airplanes in A&R Shops. They are planned so that they illustrate the breakdown of assemblies on an airplane during the disassembling process.

You find the various parts in a given disassembling process all numbered. In the same section you find photographs of the parts together with complete descriptions. Some of the parts numbers have NAF, some have AC or AAF, and some have the AN designation.

A photographic catalog is of immense help to a mechanic, and indirectly, to the Aviation Storekeeper. If the mechanic is doing an overhaul job and requires a new part for an assembly, all he has to do is look at the photograph of the part he needs to replace. He gets the item number from that, and turns to the parts list. There he finds the complete description, the class, and the part number.

He puts this information on a Stub Requisition, and you, on the receiving end, are saved a lot of doubt and confusion.

While aviation storekeeping isn't a matter of textbook studying or catalog reading, such study does help you to do a better job. After all, your first task is to handle and store materials in such a way that they'll get to where they're needed IN A HURRY. Catalogs can help you do this.

STOREKEEPING AFLOAT

If you're aboard a rolling, tossing ship that carries aviation supplies, you'll follow pretty much the same procedure that you do ashore, although there ARE differences. Everything, of course, is more compact. Every inch of space has to count. There isn't much room for expansion, and you can't skip off the base for liberty.

On an aircraft carrier, there's plenty to keep you active. Here timing means everything. Here you find



Figure 37.—Space counts aboard ship.

that ready issue rooms have REAL significance. Because there isn't any time, when things are active, to go below for spare parts and materials, you find them set up right on the hangar deck. Pilots may be waiting to take airplanes out on a mission. If stores are where they are needed and are issued without delay, Supply can't be blamed for a mission that fails.

Two factors influence the procedure of issue and dis-

tribution of aviation materials to forces afloat. One is the critical shortage of many items of stock. The other is that advance information as to strategic and tactical operations is generally available only to a few comparatively high-ranking officers.

The picture is changing so rapidly in carrier operations that only a few generalities are mentioned here. You find less paper work afloat, and you find that reports of materials on hand, requisitioning, and other store-keeping operations may be handled a little differently. And those differences may be revised again and again to suit the changing procedures of carrier activities.

Certain materials are placed under control of Fleet Air Force Commanders and they in turn allocate them to the various activities within their command. (Article 2720, 3, BuSandA Manual and Memo, tells about this in detail.) No attempt is made to establish the actual mechanics by which the fleet controls the materials.

Aboard ship you send your stock reports directly to the Supply Officer of your own Fleet Air Force. You report only the quantities on hand that are in a serviceable condition. From such reports the Air Force Supply Officer determines the type and quantity of materials to be furnished your ship. He considers a number of things. Some of them are—the appropriate allowance list, availability of materials, future operations of the ship, past issues, and similar requirements of other vessels.

Since the Air Force Supply Officer actually handles the preparation and submission of requisitions and arranges for delivery to the ship, your work is considerably reduced aboard ship.

For aviation activities other than aircraft carriers, you submit requisitions for Section B allowance list materials directly to the nearest air station. If the air station can't meet the request from its own stock, the requisition is forwarded to the Air Force Supply Officer who will approve it for issue directly from Aviation Supply Annex.

AVIATION STORES SET-UP AFLOAT

The Aviation Stores group aboard aircraft carriers and tenders is usually headed by an Assistant Supply Officer or Pay Clerk. Other personnel in the group varies with the type and size of the ship.

You carry several types of special stores in addition to the spare parts for airplanes and engines aboard carriers and tenders. Among them are aviation gasoline, lubricating oil, light clothing, breathing oxygen, spare parts for catapult and arresting gear mechanisms, aircraft radio equipment, special aviation metals and fabrics, and many other items not required on other types of ships.

BuAer, through allowance lists and commissioning tables, makes up the initial stock for a ship. But from then on, it's up to the storekeepers and Supply Officers aboard to keep stock on hand.

Perhaps one of the greatest practical tributes yet paid to Aviation Supply is the fact that the *USS Yorktown* was able to ply the waters of the South Pacific for 120 days without replenishing its stock of aviation supplies. Partly because of the minutely detailed and expert PLANNING done by SUPPLY, the carrier baffled the Japs for four months.

Because of the nature of the operations which they carry out, ships—and advanced units, for that matter—can't be assigned any regular replenishment periods or be given definite sources of supply. You have to be ready to replenish stock whenever possible and from the best source available. You **MUST BE PREPARED** to submit requisitions on very short notice.

That's why it is so essential that proper stock upkeep follow a carefully prescribed routine aboard ship and that stock records be posted promptly and accurately whenever materials are received or issued.

The usual source of supply for ships is the nearest air station. Fleet directives tell you the correct procedure for submitting requisitions. Whenever you're at a source

of supply, your ship should be stocked to its full allowance. In some instances you have to mail requisitions and leave it to the supply source to arrange for delivery. In emergencies, materials may be obtained from other vessels.

Much the same procedure for requisitioning is followed afloat as ashore. CORRECT PREPARATION of requisitions is of prime importance. When you're heading into a supply point, remember that your stay will be pretty brief. And there isn't time to correct requisitions after you get there.

RECEIPT AND INSPECTION

You may need special handling equipment to get large surfaces and engines from storehouses at an air station to the ship. The Supply Officer at the station will make this available. Care must be exercised in uncrating materials and they must be carefully inspected for damage. Be sure, too, that all material is properly tagged and identified. If this hasn't been done, get it done before the material is placed in the storeroom.

Aboard ship you store aeronautical supplies in specially constructed storerooms. They're of three general types—those for complete engines, those for large surfaces, and those with bins for minor structural spares and engine parts. Aviators' flight clothing should be in a storeroom or part of a storeroom with a special lock.

The same storage precautions that apply ashore should be followed afloat. Frequent inspections of aeronautical equipment and supplies **MUST BE CARRIED OUT** to determine that all parts are being properly stored and preserved.

Whenever possible, you'll issue non-expendable material only when you receive a similar damaged part in exchange. If the damaged part is not available, make the issue on a Stub Requisition. An exchange form should be made when making issues involving exchange.

Two files of exchange should be kept in the supply

office. One will serve as a receipt and follow-up on items undergoing repair on board. The other will cover items for which you will prepare invoices when the materials are turned in ashore. Actually, only a small portion of the damaged material will be repaired aboard ship.

The system always must be modified to provide the quickest possible issue in case of emergency. In any emergency you immediately furnish the needed material on a simple memo stub, leaving the remainder of the process to be straightened out later.

When you turn in damaged or excess material ashore, be sure it's tagged to show its condition and to enable the station personnel to identify it quickly. Such material is covered by invoices (BuSandA Form 71). If the material is damaged, the invoice should be accompanied by a copy of the exchange voucher showing the extent of damage, the cause, and the length of time the equipment was in service. If there isn't any exchange voucher, get up a statement giving the same information.

Aboard ship, you run into many conditions that can't be anticipated. That's where your ingenuity, skill, and knowledge as a storekeeper probably are put to their greatest test.

There probably aren't many spots in all the Navy that provide more possible variations than aviation store-keeping. Sometimes you may have a nice "white pants" job. At other times your dungarees will be covered with grease and oil and dirt. Sometimes you'll be working almost exclusively with your hands. Ot other times your mind will be whirling with facts and figures and statements that HAVE to be right.

This much, too, is certain. You'll ALWAYS be dipping into a bin for something that is needed. And ALL THE TIME you're right in the middle of SUPPLY. That's the thing that keeps pilots and aircrewmen in the air—defying the law of gravity and defying any enemy that may attack by air or land or sea.

How Well Do You Know—

AVIATION SUPPLY

QUIZ

CHAPTER 1

WHY AVIATION SUPPLY?

1. What, in general, are the duties of an Aviation Storekeeper?
2. What is "cannibalism" (airplane variety)?
3. (a) What is a Z type aircraft?
(b) a VL aircraft?
4. What does an air "wing" normally include?
5. Are aircraft carriers the only type of ships which carry planes?
6. What stock classifications cover standard aeronautical materials?
7. What type of material would you expect to find in Class 86?
8. What do these letter designations mean when they appear in the stock number of an aircraft part—
(a) AAF?
(b) NAF?
(c) AN?
9. What bureaus control the Aviation Supply Office?
10. What is a—
(a) CASU?
(b) FAirWing?
(c) HEDRon?

CHAPTER 2

ADMINISTRATION

1. Name some of the bureaus which control Aviation supplies.
2. Who has cognizance over material, equipment and maintenance at Naval Air Stations?
3. Does BuAer or ASO determine the type of aircraft to be manufactured?
4. What type of material falls into stock classifications 1 to 3?
5. Is it possible for Fleet Commanders to distribute aeronautical material without authority from BuAer or BuOrd?
6. What are some of the groups within the ASO organization?

7. Give the location of eight MAJOR supply points.
8. (a) From what point do the Pacific Air Forces receive their supplies?
(b) The Atlantic Air Forces?
9. Is procurement from contractors one of the functions of personnel at distribution points and major supply points?
10. Outline the probable flow of material from factory to a small aircraft tender.

CHAPTER 3

ALLOWANCE LISTS

1. What is the purpose of a TBA?
2. How do TBAs differ?
3. Does the TBA limit the amount of equipment which you can obtain?
4. Can the TBA be used for replenishment?
5. How are BuAer allowance lists divided?
6. How are ACORNS and other types of advanced bases outfitted?
7. What bureau or agency initiates procurement of aviation ordnance material?
8. On what type of planes would an item such as the BAM .50 caliber gun be included on an allowance list?
9. How is it possible to obtain changes in allowance lists for TBAs?

CHAPTER 4

PROCUREMENT, REPLENISHMENT

SCHEDULES

1. Does ASO encourage letters requesting material?
2. If a pilot makes a crash landing out in the country somewhere, how can he obtain gas and repair materials from commercial sources?
3. What are proprietary materials?

4. Are spares required in addition to material furnished with the the original airplane purchased by major supply points?
5. How often are standard parts replenished at major supply points?
6. Why cannot a definite date on which certain classes of material are replenished be given?
7. What is an SL&RR form?
8. Describe the use of the "ad interim" request.
9. Here are some procurement symbols. What do they mean?
 - (a) M.
 - (b) N.
 - (c) X.
 - (d) 5.
10. How far ahead does a dependent activity have to estimate its replenishment requirements?
11. What does "in excess," in supply terminology, mean?
12. How does "in excess" differ from "surplus"?
13. Where would you obtain materials to repair grounded aircraft if your current stocks were not sufficient to meet your needs?
14. If you urgently need critical material, how can you get it ahead of others whose need is not so pressing?
15. Where do you direct requisitions for photographic supplies?
16. Explain the difference between APA and NSA accounts.

CHAPTER 5

FORMS AND ISSUE

1. What are—
 - (a) Material procurement vouchers?
 - (b) Material expenditure vouchers?
2. For what is an adjustment card used?
3. Is APA material accounted for by money value?
4. Who signs a Stub Requisition?
5. What form is used ordinarily in exchanging damaged material for new equipment of the same type?
6. How can you exchange NSA material?
7. Can aviation ordnance equipment be exchanged?
8. What is the RMCM?

CHAPTER 6

RECEIVING, STORING, PACKING

1. Here are some common stowage terms. What do they mean?
 - (a) Issue package.
 - (b) Lot.
 - (c) Unit.
2. What type of voucher must you receive before you can issue material?
3. If you receive damaged material with an RMCM, into what class would you place it?
4. What is the Hicks System?
5. In general, is it best to tailor your bins to fit the material or stack the material to fit the bins?
6. Give some examples of material that require special care in storing.
7. What kind of passages are necessary on all storeroom walls?
8. In piling, what are the advantages of using the so-called "cubical" method?
9. Why is pyramid piling often used out-of-doors?
10. What are shop stores?
11. What is the first step to take before stowing an aircraft that has been operated?
12. What is the best way to guard against deterioration of all types of equipment?
13. What special precautions should you take in storing photographic material?
14. What special precautions should you take in storing flight clothing?
15. Outline the best procedure for shipping instruments which have been immersed in salt water.
16. How would you ship propellers?
17. What is the first thing to do when you receive a damaged crate?
18. In what position should carboys of acid or other liquid be maintained for shipment or stowage?
19. What is a good precaution against corrosion of a container?
20. How are invoices accompanying shipments prepared before shipping?

CHAPTER 7

INVENTORY—ESPARES

1. How often will you take inventory of aeronautical materials?
2. What is an Espares List?
3. Who consolidates reports of Espares and semi-critical items?
4. (a) If you are making daily reports on Espares Lists, how will you transmit them?
(b) Weekly reports?
5. If you are at a receiving activity, what is the first step you will take when an incoming aircraft is received?
6. What are inventory teams?
7. What would you do if you were transferring an engine and found some parts missing?

CHAPTER 8

STOREKEEPING—ASHORE AND AFLOAT

1. What are good ways to get to know aeronautical parts?
2. If you find an interchangeable item that does not appear on any list, what steps should you take?
3. In what order do materials appear in the ASO Catalog?
4. What does the prefix letter "R" indicate in stock numbers in the ASO Catalog?
5. What publication would you consult to find in what classes various items of material are located?
6. How are manufacturers' catalogs handy?
7. What type of activities find the photographic catalog the most useful?
8. Who ordinarily allocates materials to the various activities within the Fleet Air Force?
9. For activities other than carriers, to whom would you submit requisitions for Section B materials?
10. What are the three types of storerooms generally used aboard ship for stowing aeronautical supplies?
11. Aboard ship, what would you ordinarily receive when issuing non-expendable material?

12. When you turn in damaged materials ashore, how will station personnel be able to identify it quickly?

ANSWERS TO QUIZ

CHAPTER 1

WHY AVIATION SUPPLY?

1. Duties of an Aviation Storekeeper have been defined as "Receiving, identifying, stowing and issuing material and keeping material and storeroom in good order."
2. Removal of parts from one plane to supply another.
3. (a) Z is lighter than air.
(b) VL is Glider.
4. One squadron each of fighters, scouts, dive bombers and torpedo bombers.
5. No—battleships and cruisers carry scout observation types.
6. Class 41.
7. Aircraft material (engine accessory parts).
8. (a) Army Air Forces.
(b) Naval Aircraft Factory.
(c) Army-Navy (interchangeable).
9. It is a joint activity under BuAer and BuSandA.
10. (a) Combat Aircraft Service Unit—supporting flight operations of aircraft, usually carrier aircraft.
(b) Fleet Air Wing—several patrol or search squads operating as a unit.
(c) A headquarters squadron.

CHAPTER 2

ADMINISTRATION

1. BuS&A, BuAer, BuOrd, BuPers, BuShips, BuY&D, BuM&S.
2. BuAer.
3. BuAer.
4. Aviation ordnance equipment.
5. Yes—in order to expedite this distribution.
6. Check your answer with information on pages 18-20.
7. Check your answer with figure 6.
8. (a) Oakland, California.

- (b) Norfolk, Virginia.
9. No—this is handled by the initiating agencies or bureaus (like BuAer or BuOrd).
 10. Check your answer with figure 7.

CHAPTER 3

ALLOWANCE LISTS

1. To provide a basis for furnishing any new activity with the aviation materials it requires.
2. They vary with the individual requirements of each type and size of activity which they cover.
3. No—TBA is merely a guide.
4. Yes.
5. They are divided by sections covering different types of material, such as engines, spare parts, shop equipment, etc.
6. Special allowance lists for these activities are published, and are listed in the quarterly publication of "Advanced Base Initial Outfitting Lists."
7. BuOrd.
8. On any type of combat plane.
9. All bureaus are anxious for suggestions as to necessary changes in allowance lists, since all of these lists are merely guides.

CHAPTER 4

PROCUREMENT, REPLENISHMENT

SCHEDULES

1. No—requests should be made on proper forms.
2. He is authorized to do this himself.
3. Materials designed for one particular model of aircraft—most of these fall in Classes 80-94.
4. No—they are always purchased by ASO.
5. On an annual basis.
6. No—different classes are replenished over a staggered schedule so as to avoid bottlenecks.

7. Stock List and Replacement Request form.
8. A request made at a time prior to the next official replenishing date.
9. (a) Manufactured locally.
(b) Items stocked only as complete assembly.
(c) Standard stock.
(d) Obsolescent or obsolete.
10. Six months.
11. The quantity over and above what is actually needed AT A SUPPLY POINT.
12. Quantities over that required by the entire Navy.
13. From ASO, with an "ad interim" request.
14. Use a "priority request."
15. To nearest distribution point for these supplies. (There are eight of them at present.)
16. Check your answer with information on pages 57-61.

CHAPTER 5

FORMS AND ISSUE

1. (a) Initiated in requesting materials by ASO, BuAer and BuOrd.
(b) To show that materials have been shipped in compliance with request voucher.
2. To reconcile conditions between stock on hand, the stock cards or the class ledger.
3. No—it is accounted for by quantity.
4. Any officer so authorized.
5. An exchange request.
6. This cannot be exchanged.
7. Yes—use an exchange request.
8. Return Material Credit Memorandum.

CHAPTER 6

RECEIVING, STORING, PACKING

1. (a) Package suitable for issue—usually as originally received from manufacturer.

- (b) Quantity received and stowed at one time.
- (c) Unit of issue—for example, dozen, gallon, etc.
- 2. Through a Stub Requisition or Shop Stores Replenishment Requisition.
- 3. Class 265 for salvage.
- 4. System of stowage named for Admiral Hicks.
- 5. Try to tailor bins to fit material.
- 6. Compressed gases, alcohol, gasoline, delicate instruments, acids.
- 7. Fire passages.
- 8. It saves space, is easier to keep uniform, inspect and count.
- 9. It is easier to cover from weather because of its shape.
- 10. Stores maintained by ships for items used very often.
- 11. Drain out all gasoline, oil, water, and dry and seal tanks.
- 12. Inspect it frequently.
- 13. It should go in chilled boxes painted black inside and kept in the dark.
- 14. Be sure to protect it against moths.
- 15. Check your answer with information on page 96.
- 16. Check your answer with information on page 100.
- 17. Make a report of the damage to the proper authority and to the transportation company, if one is involved.
- 18. They should always remain upright.
- 19. Line it with waterproof paper.
- 20. They are enclosed in waterproof envelopes.

CHAPTER 7

INVENTORY—ESPARES

- 1. Once a year.
- 2. Report of Essential Operating Spare Parts and Assemblies; in other words, critically short items.
- 3. ASO.
- 4. (a) Teletype.
(b) Air mail.
- 5. Make a complete inventory of aircraft and engine.
- 6. ASO has established these to visit supply points to check

records and make supply inventories on Espares and semi-critical items, with a view to possible re-allocations.

7. Before transfer, draw out missing parts from stores or from operating spares to remedy shortage.

CHAPTER 8

STOREKEEPING—ASHORE AND AFLOAT

1. Contact with them; visiting various shops, consulting ASO and other catalogs.
2. File the information and pass it on to ASO.
3. By stock classes.
4. Items considered to be a strictly aeronautical application.
5. Classification Index of Naval Aeronautical Materials.
6. They may be used as supplementary references, and in some cases, they may list some items which are not found in regular Navy stock lists.
7. This catalog is very helpful at A&R and smaller shops, since it illustrates the breakdown of aircraft assemblies.
8. Commander of the Fleet Air Forces.
9. To the nearest air station.
10. Those for complete engines; those for large surfaces; and those with bins for smaller parts.
11. Wherever possible, receive a similar damaged part in exchange.
12. Always tag this material. An invoice should accompany it as well as a copy of the exchange voucher showing the extent of damage, cause, and the charge of the equipment.

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